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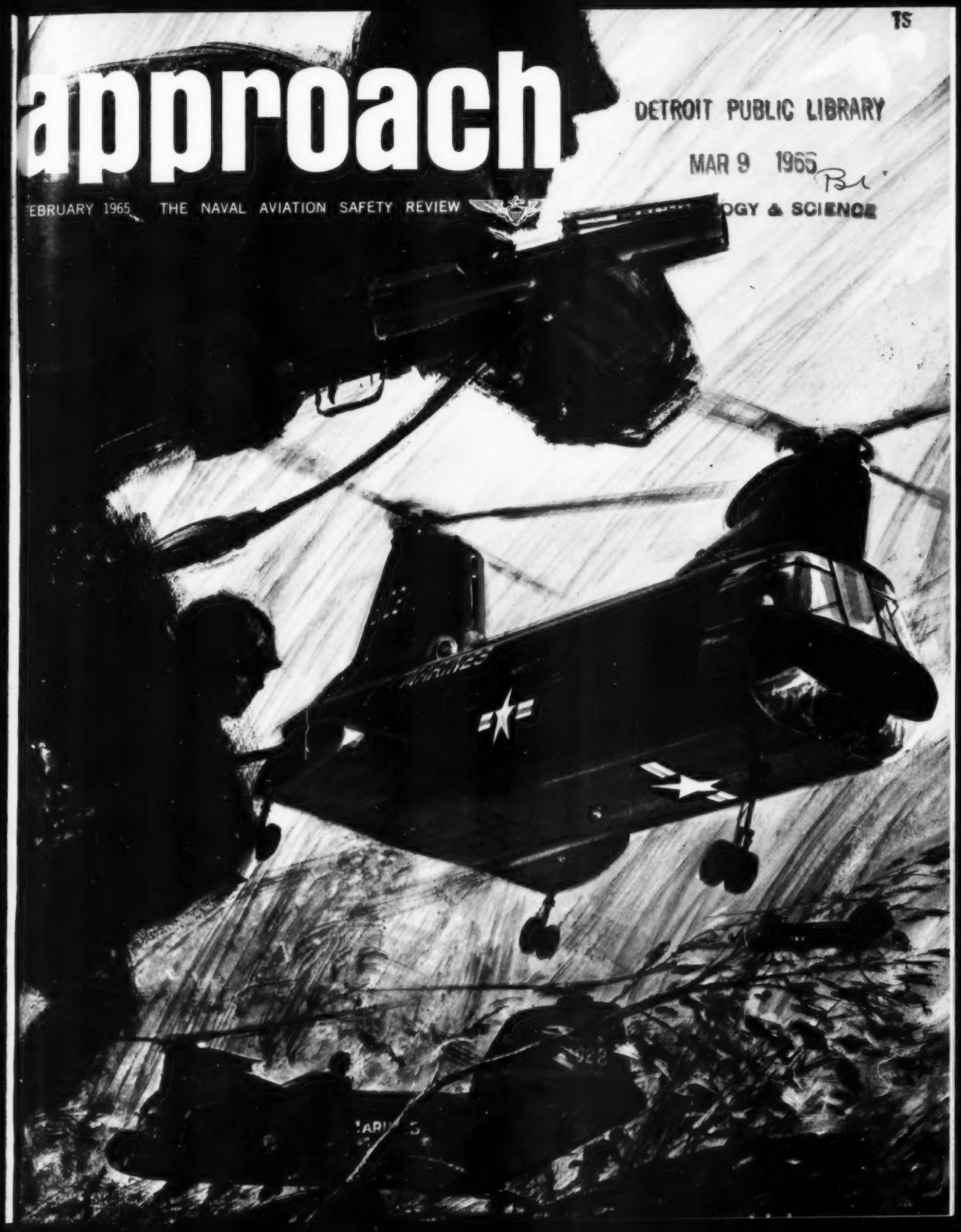
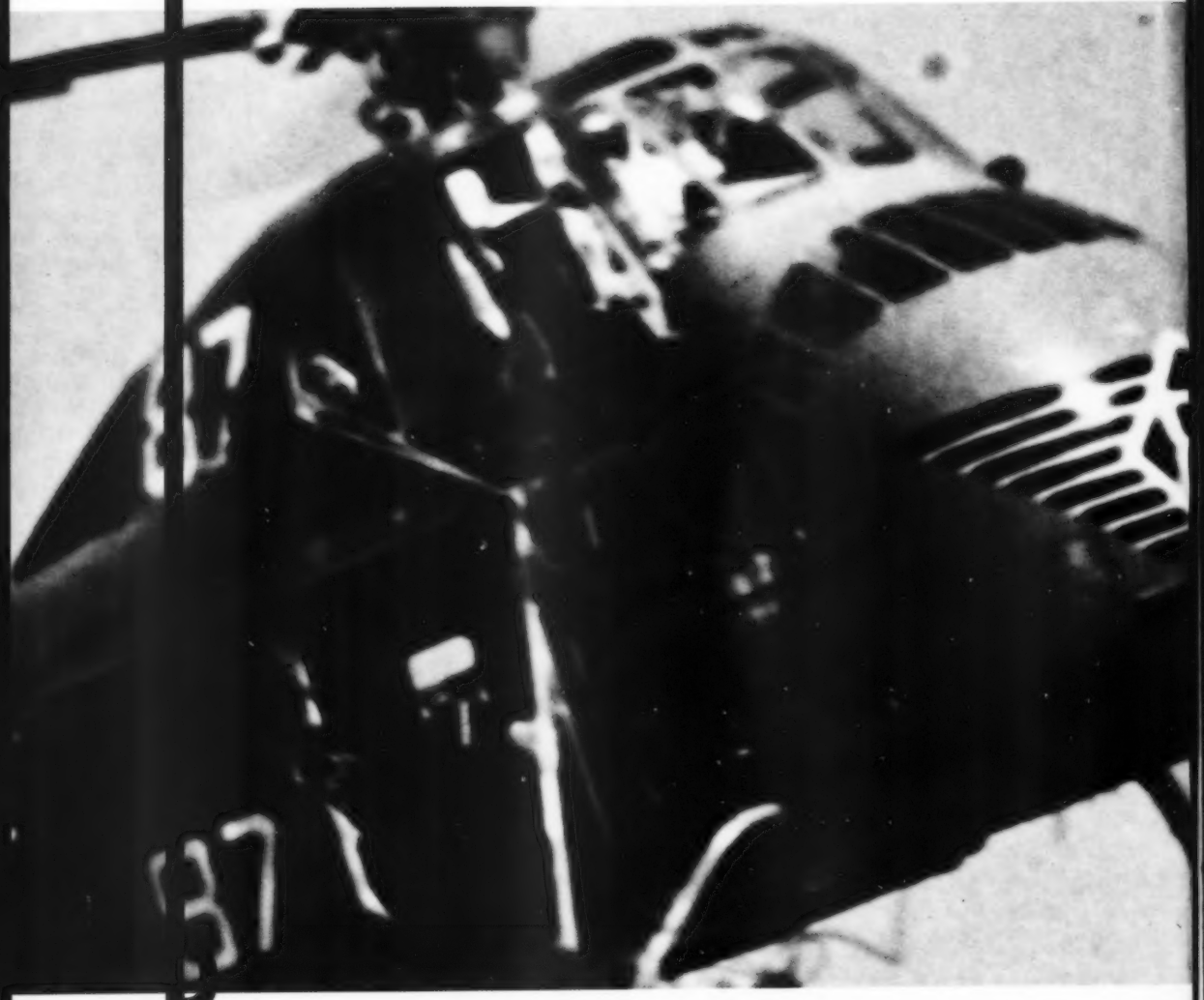


HELICOPTER



RESCUE

By LT R.S. Golt, USN
FICPAC

The lives of several thousand men were saved by helicopter during the Korean Conflict. During this period many useful techniques were developed which greatly facilitated the operation of helicopter rescue. This article reviews some of the most useful of those techniques.

The universal problem in helicopter rescue is coordination between the helicopter and the survivor on the ground. The better the understanding between the two, the more readily rescue can be effected. A helicopter, contrary to popular opinion, is not the ultimate vehicle in versatility; it has many operational limitations that determine its capability to effect a rescue under a given set of conditions.

One of the first considerations facing the helicopter pilot is that of range and airspeed. Although the average rescue helicopter can remain airborne from three to four hours, the low airspeeds of the machine greatly reduce on-station time in the rescue area. The pilot therefore must often locate and evacuate the survivor in a minimum amount of time. This time factor becomes highly critical in the presence of hostile ground troops; often, unless rescue can be effected immediately, it may not be effected at all.

The man on the ground must do everything possible to hasten and facilitate a rescue under such conditions. He must carefully plan the use of his signaling devices and employ those that will provide the best chances of success. A survivor under a dense canopy of trees may find that the smoke flare is useless, because the smoke often remains beneath the tops of the trees; however, the night end of the flare may prove valuable, even during the day, due to the darkness beneath the trees. Likewise, the signal mirror may prove ineffective due to the lack of light, but such items as the Very pistol and pocket flare gun will be useful. On open ground the survivor should attempt to construct a large, permanent signal that will be visible for a long distance.

A helicopter is capable of various types of pickup: actual landing, and takeoff; partial landing (one wheel, etc.); and hovering. For general purposes we will consider the hovering pickup, as this probably demands the most of both helicopter and survivor. The actual choice of rescue method will depend greatly upon local conditions—obstacles, vegetation, density altitude, wind velocity and di-

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rection, and the presence of small arms fire. These factors are considered separately below.

Terrain: The survivor should attempt to locate a pickup site which is easily detectable from the air. It should be a large, open area, preferably at the top of a crest, ridge or hill. This will greatly assist rescue pilots in locating him, as well as in keeping him in sight during the approach. The area should be as level as possible and free from any high obstacles, particularly in the area downwind of the survivor. When a clear area is not available, the helicopter will have to make its approach to a high hover, requiring critical power settings (short rescue cable lengths may entirely preclude this method). In this case, the survivor should select an area that will afford the helicopter the shallowest approach possible with respect to surrounding obstacles. The more shallow the approach, the easier the task of the pilot. An extremely steep or vertical approach will often be difficult or impossible.

Vegetation: If possible, an area should be chosen that will permit the helicopter to hover well clear of vegetation and yet be at a lower altitude than the diameter of its main rotor. If this is not possible, the area taken should be clear enough to permit the helicopter crew to keep the survivor in sight and lower the sling through the foliage without risk of fouling. If the area selected is not adequate, the survivor will have to coordinate his movements to another site with the helicopter crew. Often, the rescue pilot will fly in the desired direction of movement and attempt to signal the survivor by hovering or orbiting the new site. Hand signals will prove useful in coordinating movement to the new site. Voice communications, except by radio, will be virtually impossible due to the high noise level of the helicopter.

Density Altitude: Maximum power requirements are placed on a helicopter upon entering and departing a hover. These vary considerably, however, with density altitude: an increase in density altitude will require a considerable increase in power and may make it impossible for the helicopter to hover at its current weight. When this occurs, it will be necessary for the aircraft to burn down fuel in order to reduce weight before entering a hover. The survivor should be aware of this possibility and realize that a high elevation or a hot, humid day may prevent the pilot from immediately entering a hover.

Wind: Wind speed and direction also place certain limitations upon the helicopter. It is necessary for a helicopter to enter a hover or land into the wind, as this provides the rotor system with a relative forward air speed which reduces power requirements. Low or calm winds may possibly require the pilot to burn down fuel to a lighter condition before hovering. Wind direction will also determine the path of final approach and departure path of the helicopter, and care must be taken to select a site

where this path is free of obstacles.

Sequence of Typical Rescue Pickup

In order to better picture a helicopter rescue from the pilot's standpoint, a typical rescue problem is presented. It must be remembered that prevailing conditions will determine the sequence of events.

The pilot, upon locating a survivor, will normally begin a series of reconnaissance passes to ascertain the conditions of the rescue. The first of these will be a high pass to determine suitability of the site with reference to other areas nearby. Upon "accepting" the site, he will then fly a lower pass to check the local area obstacles and turbulence and to find an "escape path" if necessary. A third pass will normally be flown to determine power requirements and check wind conditions. During these passes, if no unfriendly elements are present, the survivor can assist the rescue by lighting a smoke flare to determine wind direction or by indicating it with a flag or shirt.

The pilot will then commence a racetrack pattern that will put him into the wind above the survivor. While the plane is entering the pattern, the crewman will be opening the hatch and rigging the rescue device. This device will consist of a sling, collar, anchor, or hook arrangement (the survivor should already be familiar with these devices and their usage). As the helicopter turns into the wind for final approach, the crewman will switch to "hot mike" in order to direct the pilot into position over the survivor. (From this time forward, the survivor should direct any signals to this crewman.) After the plane is in a hover, the crewman will lower the cable. The survivor should wait until the sling

Upon locating a survivor, the helicopter will normally make a series of reconnaissance passes.

has reached him and can be comfortably entered, rather than attempting to jump or catch it. After entering the sling, the survivor should not try to assist the crew further, but should remain inert in the sling and allow the crewman to help him into the plane. As the survivor approaches the hatch the crewman will turn him around and pull him into the aircraft. Once inside, the survivor should get settled as quickly as possible and strap in for the flight.

This pattern will be modified somewhat for an actual or partial landing, but the basic sequence will remain the same. On a pickup by actual landing, beware of the helicopter rotors. All helos with a single main rotor should be approached in a crouch from the side at an angle which places him in view of the pilot.

Four Rules to Remember

(1) *Anticipate*: Know your emergency equipment and how to use it. Be particularly familiar with the operation of the rescue helicopter, signaling equipment, and air-to-ground signals.

(2) *Communicate*: Before ditching or ejecting, attempt to transmit an accurate position report, with particular reference to local terrain and significant landmarks. Once on the ground attempt to assist the pilot by providing him with necessary information about wind, and so forth.

(3) *Plan*: Assume that you will have several days to wait and commence survival and evasion tactics in accordance with current policies. Attempt to locate the best recovery site in the local area and plan routes of access. The more planning you do prior to the arrival of a helicopter, the smoother will be the rescue.

(4) *Cooperate*: Follow any instructions from the crew of the helicopter; do everything in your power to advise them of local conditions and assist them in effecting the recovery. Above all, remember that coordination is the prime factor in a helicopter rescue and can make the difference between success and failure in an actual situation.

Short Snorts

Flying is a profession—*BE PROFESSIONAL!*

Hard Hats

We have noted that our pilots are somewhat reluctant to wear hard hats while flying the HU-16. This feeling of reluctance no doubt stems from the fact that the HU-16 is very seldom the subject of the Accident Board deliberations.

However, the HU-16 is a SAR aircraft and as such has been, and no doubt will be again, called upon to make open sea landings. These are sometimes hazardous in the extreme. Even water landings in sheltered areas may have their unexpected moments.

The point is that there appears to be a better than average probability of an HU-16 takeoff or landing getting out of hand, especially if it's on the water. If this occurs, some head banging about in the cockpit and crew stations is quite likely.

In recognition of this probability, the NATOPS Manual for the HU-16 states unequivocally that all crew members shall wear protective helmets on all takeoffs and landings. It also states that all crew members will be strapped in for all takeoffs and landings.

To ignore these requirements is to ignore some very high priced lessons learned from previous accidents.

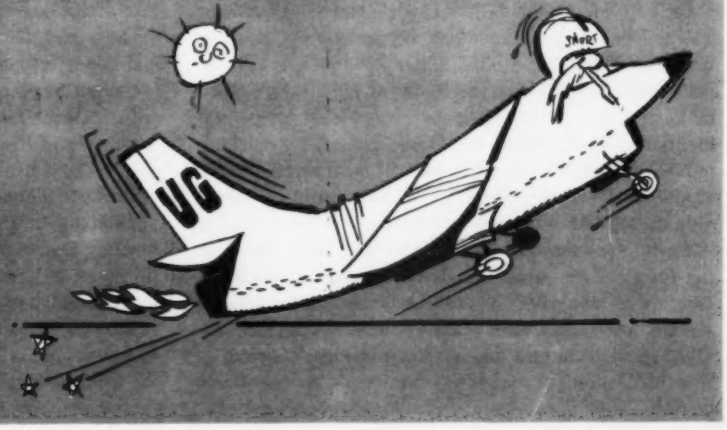
Wear your hat and save your head.—*NAS Guantanamo*

Startled

AN RF-8A driver with over 340 hours in type was seconds away from touchdown when he hauled back on the stick, overrotated, and scraped the tailpipe incurring Echo damage to the aircraft.

Not hard to do!

His problem: The viewfinder cover dropped from the face of the viewfinder. When the pilot saw the runway "looming" up at him through the viewfinder, he was startled, and instinctively pulled the stick back. . . . Scraaaape. . . .



After an initial waveoff, the student pilot made six successful touch-and-goes in an A-1H. His eighth approach and seventh landing were not remarkable although rollout seemed a bit long. When he added power for the takeoff, the aircraft began to angle left and became airborne just before running off the runway. Left wing dropped and contacted the ground and the aircraft crashed. The pilot escaped with a small cut of the right arm.

Routine tests were made at the hospital where the pilot was taken for a complete post-accident physical. *His carbon monoxide hemoglobin saturation was 27 percent.*

The student pilot is a non-smoker. He had no disease and was not anemic. With these factors ruled out as causes of the test results, investigators concluded that "toxic contamination of the pilot at the time of the accident by reason of saturation of his blood with carbon monoxide is considered to be

CARBON MONOXIDE P

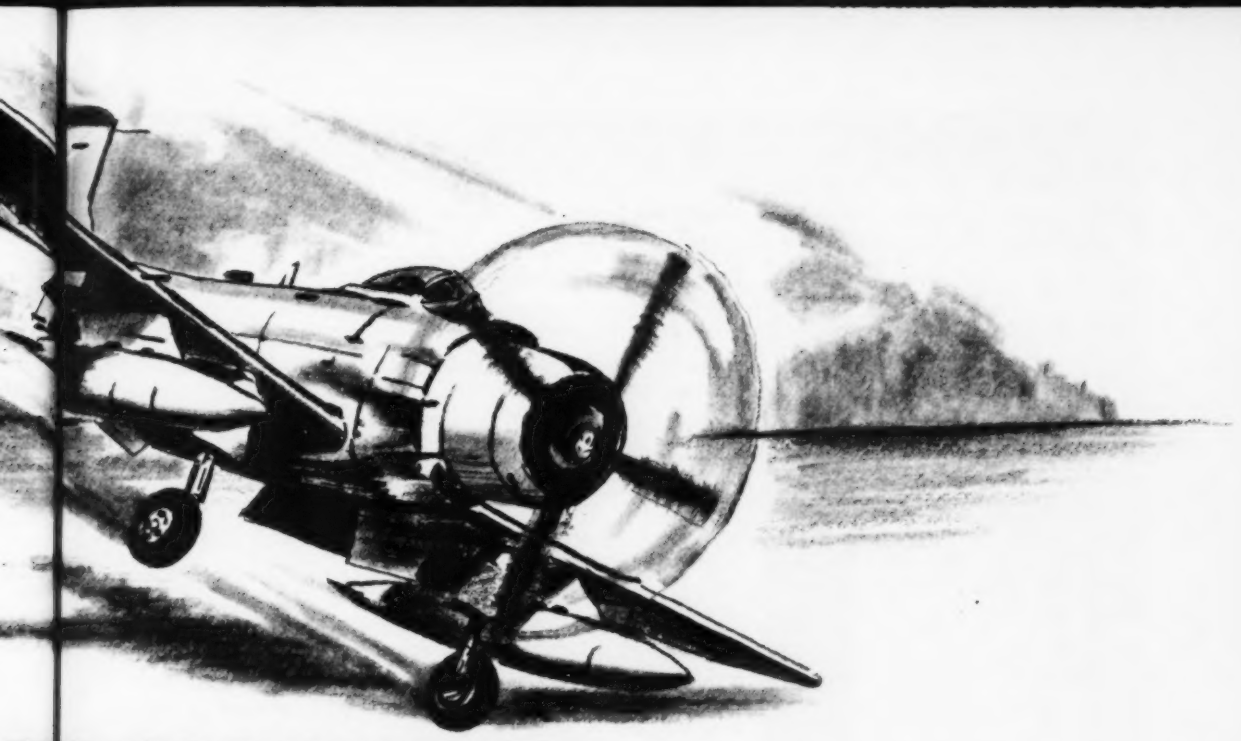
the primary cause of the accident." The suspected source was the open canopy during the 10-minute interval while the aircraft was being armed. . . .

Carbon monoxide is a colorless, tasteless, odorless and deadly poisonous gas. Its presence should be suspected whenever exhaust gases are smelled. It may enter the occupied compartments of all aircraft, particularly those propelled by reciprocating type power plants. In helicopters, the concentration of carbon monoxide may increase rapidly when hovering with engine exhaust to windward with cockpit windows either open or closed.

Carbon monoxide is absorbed exclusively through the lungs. Even when inhaled in minute concentration, it is absorbed at a high rate in the bloodstream. A number of factors affect the rate of absorption: rate and depth of respiration, concentration of carbon monoxide in the air, duration of exposure, blood volume and hemoglobin concentration, and degree of saturation of the blood with carbon monoxide. Its toxic effects occur more rapidly when there is a reduction in the concentration of oxygen in the air, an increase in temperature or humidity, or an increase in the amount of physical activity being performed.

Carbon monoxide is, strictly speaking, not a poison, but it acts as a "tissue asphyxiant." 1) It combines with hemoglobin to partially exclude oxygen. (The affinity of hemoglobin for carbon monoxide is 210 times that for oxygen.) 2) Hemoglobin partially saturated with carbon monoxide holds on to its oxygen with the result that less oxygen is liberated to the tissues. These two factors combine to produce hypoxia.

The first recognizable physiological symptom accompanying carbon monoxide poisoning is usually the sensation of tightness across the forehead, together with possible slight headache and dilation of



EPOISONING

...the invisible killer!

the blood vessels. These symptoms, however, are not necessarily experienced until blood saturation with carbon monoxide is at an unsafe level (as, for example, in the case of the student pilot).

The USAF *Flight Surgeon's Manual* lists the following symptoms of carbon monoxide intoxication in order of frequency: headache, weakness, vertigo, nervousness, dyspnea (shortness of breath), paresthesias (burning, prickling sensations, etc.), muscular twitching, emotional disturbances, nausea, drowsiness, unsteady gait, muscular and joint pains, tremors, muscular cramps, coughing, sweating, vomiting, insomnia, anorexia (loss of appetite), precordial distress (pains over the chest or stomach), vasomotor instability (paleness and flushing of skin), perversion of taste and smell, impairment of speech and hearing, hoarseness and yawning.

Under ordinary conditions, blood concentrations of carbon monoxide up to 10 percent saturation usually cause no symptoms. As blood saturation increases, symptoms appear. (See Table 1) "Ordinary conditions" means sea level, moderate physical activity and normal hemoglobin. As altitude increases, the hazards of carbon monoxide increase. Mild hypoxia and small amounts of carbon monoxide can combine to cause serious impairment. Again we quote the *Flight Surgeon's Manual*:

"For example, a concentration of 0.01 percent carbon monoxide, relatively safe at ground level, reduces the oxygenation of the blood by 10.5 percent and at 10,000 feet is superimposed on the reduced blood oxygen saturation occurring at this altitude.

% CO in Air	Effects
0.02	Possibly headache, mild frontal in 2 to 3 hours.
0.04	Headache, frontal, and nausea after 1 to 3 hours; occipital after 2½ to 3½ hours.
0.08	Headache, dizziness and nausea in ¾ hour; collapse and possibly unconsciousness in 2 hours.
0.16	Headache, dizziness and nausea in 20 minutes; collapse, unconsciousness, possibly death in 2 hours.
0.32	Headache and dizziness in 5 to 10 minutes; unconsciousness and danger of death in 30 minutes.
0.64	Headache and dizziness in 1 to 2 minutes; unconsciousness and danger of death in 10 to 15 minutes.
1.28	Immediate effect; unconsciousness and danger of death in 1 to 3 minutes.

(Reprinted from Industrial Toxicology by Hamilton and Hardy, Second Edition, by permission of Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York. Copyright 1949.)

Table I. Effects of various concentrations of CO (carbon monoxide) in air at sea level.

resulting in a dangerous state of hypoxia. This condition is of even more serious import in aircrew members who are heavy smokers, as such individuals may begin with a base line of 8 percent carbon monoxide saturation." (BuWeps Inst 3750.2 of 8 July 1962 puts the baseline at 7 percent of the hemoglobin immobilized in this manner. This, the Navy Instruction states, may lower the ceiling of these pilots as much as 5,000 feet because the available oxygen carrying capacity of the blood is correspondingly lowered.)

In a recent Navy accident involving a helicopter on a SubEx, the pilot was hospitalized with a back sprain. He also complained of a splitting headache. Among the routine laboratory test findings was a 12 percent carbon monoxide blood saturation. When the pilot recalled smoking more than 30 cigarettes during the day of the accident and smoking heavily while "waiting around" between the two exercises scheduled, the carbon monoxide finding was attributed to heavy smoking.

BuWeps Instruction 3750.2 directs pilots and flight crews who suspect carbon monoxide to take the following precautions:

- Pay particular attention to the detection of odors of engine exhaust fumes and to the development of symptoms indicating carbon monoxide poisoning. If carbon monoxide contamination is suspected prior to takeoff, the flight shall be discontinued until the source of contamination is determined and eliminated.
- Set the diluter demand valve at 100 percent OXYGEN position, regardless of altitude, whenever excessive carbon monoxide or other noxious or irritating gas is present or suspected. Use undiluted oxygen until danger is past or flight is completed.
- Take precautions during ground operations to avoid contamination of the airplane either by its own exhaust or by the exhaust gases of adjacent airplanes. When operating the following aircraft, avoid taxiing or standing with canopy open, especially under the conditions indicated below:

  A-1 Wind from either beam

  T-28 Wind from either beam or from tail

CO Poisoning

A professional air traffic controller, Jack C. Fahy of San Antonio, Texas, was named the Air Traffic Control Association's third place Controller of the Year for 1964 for saving the life of a Navy jet pilot suffering from carbon monoxide poisoning.

The controller was alerted to trouble by the pilot's heavy, mumbled speech and his erroneous navigation. He then found the pilot himself was aware of some physical trouble though apparently unable to cope with it.

"In order to gain more information which people on the ground could use to aid the pilot and to keep him alert as possible," the FAA award nomination letter states, "the controller began questioning him. Slowly but methodically, he asked about the aircraft's oxygen system and how it was working, the cabin pressure and other instrument readings. What was the status of the heating unit—was it on or off? He instructed the pilot to take 13 breaths per minute to see if that would help. (*This was to prevent hyperventilation.—Ed.*) He quizzed him about the possibility of getting fresh air into the cockpit.

"This constant chatter was to continue for 45 minutes. . . The controller had cleared the jet for immediate descent but during the questions learned that the pilot had descended only a few hundred feet. Finally, after much coaxing and encouragement the pilot established a near normal rate of descent. When a safe altitude was reached, the controller instructed him to open the fresh air vents, turn off the cabin heater and report on his fuel consumption and remaining fuel. During this period the controller continuously questioned the pilot on how he was feeling and kept up the encouraging chatter.

"Within a few minutes after the pilot reported the fresh air vent open and cabin heater off, he stated that he was able to see the small instruments and was feeling a little better. However, he said he was still dizzy and was afraid he might black out again. (*The FAA letter does not mention a previous blackout.—Ed.*) Several minutes later the pilot was again sounding and reacting near normal."

When the pilot reported that the airport lights were in sight he told the controller, "If it wasn't for you I wouldn't be here now."

Later it was learned that the jet had been leaking carbon monoxide gas into the cockpit from the main heater and that the pilot's oxygen mask had been leaking ambient air.

- In helicopters, avoid hovering with engine exhaust to windward.
- Ascertain that the preflight inspection chart shows that all fuselage openings including torpedo doors and depth bomb assembly doors are closed and properly secured.

The same Instruction outlines carbon monoxide preventive maintenance for maintenance personnel.

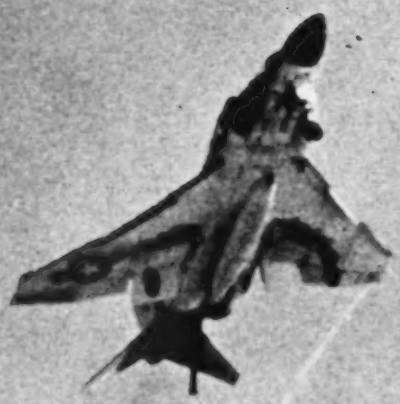
If CO poisoning is suspected and the victim is not grossly overcome by the gas, he should be taken to a physician as soon as possible. If severely poisoned with CO, he should be started on oxygen immediately. Upon arrival at a dispensary or hospital, a blood sample should be drawn by medical personnel for CO determination. If only a mild case of CO poisoning is suspected, no cigarettes should be smoked before the test. Smoking raises the CO content of the blood and thus will falsify test results.

About half of the CO in the blood is eliminated within one hour after moderate exposure. At least eight hours are required to eliminate the CO completely. Treatment is administration of 100 percent oxygen and, if required, 6 to 7 percent carbon dioxide. In some cases artificial respiration is necessary to revive the victim.

It is obvious that CO poisoning cannot be adequately discussed here, so please ask your flight surgeon to say a few words on this and other similar subjects the first chance you get.

TO BE OR NOT...

By LT Raymond A. Patterson, VA-86



Famous poets have posed some interesting and thought-provoking questions to their audiences.

"Is it better to have loved and lost, than never to have loved at all?"

"To be, or not to be. . . ."—an interesting question. To be *male*, or *female*—now we sure didn't have much choice in *that* decision!

As we grow older, we find that we do begin to have more power to determine whether we were to be, or not to be: on a basketball team, a college graduate, the owner of a car. Now as aviators we have arrived at a certain position in life, the culmination of our decisions to be, or instead, not to be. In retrospect, how many of the "to be, or not to be's" were the result of our training, supervision, environment. Most of our decisions were based in part or wholly upon some of these conditions. This background is the basis upon which we make our decisions for the future.

When I was an eaglet under training, I was very impressed by the salts and their sea stories of the old days. That was when a barrier engagement was a fact in all naval aviation careers: "There's them that has and them that will have." The angle deck removed the inevitability of that prospect from my future. The Navy also added the mirror/lens, and the paddles pass began slipping into oblivion.

Naval aviation has learned and profited much from its past—making tremendous progress along mechanical lines. The critical link in our chain of progress is still the human one. Though we are improving and improvising our operation we still rely very much on the pilot in command to make the decisions, or salvage a bad situation created by someone or something else.

In the early days of aviation, some of these select few that were endowed with wings felt a compelling drive to perform for the unfortunate masses that were limited to an earth and sea environment. The general term used to describe this caper was and still is *flathatting*.

From what I have heard, it was undoubtedly a truly spectacular sight to see a winged monster hurtling toward the earth at awe-

some speeds. Then by the most judicious use of all dexterity at his command, subject aviator would pull out at an altitude which came as close as possible to being eyeball to eyeball.

Those were the so-called *good old days*. Men trembled and women swooned as "the eagle" or "the tiger" entered the bar. To the fledgling, these were more than mere mortals; to the old pros, these were merely mortalities.

Civilian populations were impressed—but to the point of becoming irate. These intrepid ambassadors rustled leaves, occasionally removed loose shingles; and alas, on numerous occasions also visibly transfigured the landscape to the point of becoming united with it—permanently.

The powers that be were sufficiently alarmed to set down certain laws, rules, and regulations in an attempt to stop this needless waste of life and property. Since this situation could not be tolerated then, in this day and age we can scarcely afford to lose a complex weapons system, a trained aviator or crew, plus the ever present possibility of being faced with a "touchy" civilian public relations problem.

When an incident or accident of this nature occurs, the term "pilot factor (or error)" ultimately enters. Some quarters divide pilot factor into three subdivisions —errors of technique, errors of judgment, and errors involving the violation of orders.

Usually the technique error occurs during the initial learning phase of an operation or maneuver. The cause might include a lack of training, inadequate supervision, or psychological and physiological reasons. *Flathatting is in part an error of TECHNIQUE.*

When given a choice, a pilot must decide which course of ac-

tion he will follow. When the wrong or unsafe action is taken we have an error in judgment. This may stem from indifference to the recognized principles of safe flight, inadequate supervision or training, or individual negligence or carelessness. *Flathatting is also in part an error in JUDGMENT.*

General flight and operating rules and instructions are often promulgated to relieve the pilot of making certain decisions. History has shown that some actions have killed pilots, destroyed aircraft, and so endangered and inflamed the public to the point of requiring that they be outlawed. Because these dangerous practices have received such wide publicity, violation could scarcely be the result of ignorance. Complacency, inattention, exhibitionism, and overexuberance *do* play a limited role; but flathatting begins when a willful decision to disobey a well disseminated rule is made. *Flathatting is primarily an error involving the VIOLATION OF AN ORDER.*

There is no room for doubt in OpNavInst 3710.7b; it says "no acrobatic maneuver shall be conducted where during the course of the maneuver, the entry, follow-through, or completion (the aircraft) will be below an altitude of 1500 feet above the surface of the water, the ground, or highest projection thereof.". . . It also states "all acrobatic flying performed in naval aircraft shall be conducted within the limits of designated acrobatic areas."

With the exception of weapon delivery techniques, NATOPS limits most jet aircraft to doing acrobatics above 10,000 feet. There are of course times when our services are required for an Anti-Air Warfare Exercise, and the OP Order usually contains the minimum altitude for our run-in. In the event it doesn't, minimum altitude is 1000 feet. Yet, in the last two years there have been five fatal accidents where an aircraft passed a ship at or less than 100 feet, pulled the nose up, commenced a roll, and entered the water in a nearly vertical dive. Authorized? **No!** Legal? **No!** Fatal? **Yes!!**

These instructions are all specific. Now there will be the cynic that says "all that is well and good, but I remember the time. . . ." Exceptions exist to every rule. My purpose is not to explore every possible set of circumstances that may arise or rule out the possibility that deviations from the rules may be necessary—but rather to stress looking at *the reasons behind the regulations!*

There is an increasing trend toward a conventional warfare capability within the attack carrier fleet. The ASW mission has always been one of a low level nature. Both fighter and attack aircraft perform low level missions in maintaining their readiness posture. ComFAir, in this area, has set up and authorized certain SANDBLOWER routes for the specific purpose of low altitude navigational and/or bombing tactical training.

Because of the inherent dangers in this type of mission, detailed instructions are written to minimize hazards and at the same time al-

Just what are the reasons behind the Regulations?

low for the greatest amount of training to be derived from these flights. A chase pilot for safety is mandatory and his responsibilities are outlined: to ensure that routes and minimum altitudes are adhered to and that obstructions and airports and associated areas are not inadvertently overflown, and to keep a "sharp eye" for the other aircraft.

The lead pilot is responsible for: preflight planning as to the route and minimum altitude, maintaining flight within the altitude and airspeed restrictions specified, avoiding populated areas or airports inadvertently encountered, following specified lost navigation procedures, doing his utmost to keep from jeopardizing persons or property in the event of an aircraft malfunction, and monitoring a frequency.

It is the commanding officer's responsibility to ensure that a pilot is qualified to fly at the minimum altitude, and it is recommended by ComFAir that training be initiated at 500 feet and then gradually lowered.

While minimums may vary, the principle remains the same. Experience has shown pilots and aircraft tend to become "bent" when flying too low, therefore, "Thou shalt not go lower than 200 feet AGL over land and 100 feet over the high seas." Other restrictions apply to mountainous terrain and night operations.

Even when all of these rules are obeyed there are accidents and incidents. It is a hazardous profession. Bird strikes cause the largest number of incidents. In almost every instance the low level type accidents that result in the loss of aircraft or cause inconvenience, annoyance and concern to the civilian population, can be attributed to improper planning, flying too low, or pilots becoming lost. The pro will plan it right and fly it as planned, and if he does become momentarily disoriented (pros don't get lost), he will admit the fact and profit from that experience. If he should happen to hit a bird, his thorough knowledge of emergency procedures will minimize the risk of further damage to himself, the aircraft, and those over whom he is flying.

There is a related category of low level flying that is cause for concern. It is not pre-planned along specified routes, minimum altitudes are not adhered to, and there usually isn't a chase pilot along. The training accrued is negligible. I am referring to the impromptu low level. This is the one the accident reports show to be a sometime killer. It requires the deliberate infraction of established rules. Aviation has found

out that the road to longevity is short when paved with unauthorized illegal low level flights. This type of maneuver leads us to an even greater killer.

While gathering material for this presentation the remark was made that if a Naval Aviator was given a large enough audience a sufficient number of times he would ultimately kill himself. The impromptu low level often precedes or is a part of what might be termed a one man air show—a problem that has plagued aviation from the start. Because of their frequency, sonic booms, too, have lost their novelty and while impressing your immediate audience you are probably making everyone else for miles around rather put out.

If someone you wish to really impress wants a close look, they can usually have access to the aircraft when it is on the ground. They might even be able to walk around it, touch it, and ultimately sit in "your" seat. For a more permanent reminder a photograph is recommended. The performance data on the aircraft you fly is undoubtedly equally impressive. You go such a great distance at a fantastic speed and so frightfully low. You possess power to climb to dizzying heights in seconds. Impress them with all this data by reading it to them from the handbook. This way you have a fairly substantial chance of being around to tell your grandchildren first hand. If they only have a picture on the wall and a white cross in some cemetery to remind them of you, those same figures will be much less impressive. Maybe your widow can add some details—how long the wreckage burned, the number of homes you went through before coming to a rest, the number of people and flowers at the funeral. . . .

After all why are we Naval Aviators here? What is our mission? If we were equivalent to a matador we could give the same answers he would. There is a time and place for a show. Undoubtedly we are all capable of performing a fantastic display of airmanship, with the proper training. But it isn't our mission; we aren't trained for it; and there is no place for this violation of air discipline in the performance of a professional. The term professional is usually attributed to all aviators.

The day your wings were pinned on you, you were probably the greatest thing that ever happened to aviation and you may have been willing to prove it to any and all comers. To say that your confidence exceeded your proficiency would be an understatement. You had earned the title of aviator, you had yet to become a professional. This is the product that usually arrives at the fleet squadron. The aggressiveness displayed by the junior officer is a desirable and necessary trait. Without it, his ability to perform the assigned mission or cope with unexpected and sudden emergencies would be doubtful. But how does this aggressiveness become the discipline of a professional?

Ethics, integrity, personal discipline—whatever you want to call it—are not learned by teaching. A lecture in an APM or a safety movie does *not* instill this sense of personal responsibility within the junior aviator. He does learn by example and experience.

If you are a junior officer newly arrived in the fleet, take a long look at yourself. Be honest. You are the source of over ninety-two percent of the fatal flathatting ac-

cidents. This is a fact of history—need it be a fact of the future? As the safety poster says, "We must be ever mindful of the mistakes in aviation history or we are condemned to repeat them."

If you are an experienced first tour junior officer, set the example for those who will follow. You have been flying the same type of aircraft performing the same mission for over two years. You are good. You will never be better. Your reflexes are honed to a razor sharp edge. Training has been intense and continuous. You know the aircraft and what you can make it do.

If you are seen pushing it to your limit, your actions will be imitated. If you do so under unsafe conditions, the junior officer using you as an example may try to go just one better to show that he can "hack it." Regrettably, all too often he can't. Yours is the measure of proficiency that will be the example to be matched; yours is the responsibility to set the example of safety and air discipline.

Ultimately, the burden of responsibility rests upon the shoulders of the skipper. He is the one that determines the standards, his is the experience that will mold those who serve him. In the final analysis, aviation safety and accident prevention is affected more by the quality of professional competence demonstrated by key individuals than any other single consideration.

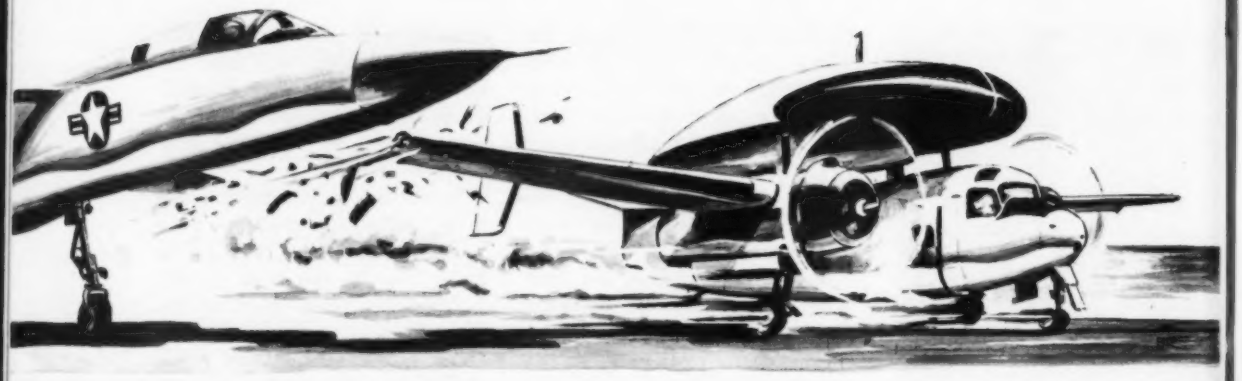
This is our problem, our challenge, and our mandate. There are three words that reappear in accident reports concerning flathatting: overexuberence, exhibitionism, and complacency. As a junior officer we must examine our actions for the tendency which could lead to one of those three attitudes. If you can catch yourself and discipline yourself, you can save yourself.

As an experienced pilot within the squadron, yours is the challenge to mold constructively. You are the leader that will show the way and debrief the mistakes. Yours is the responsibility to notice a trait in its formative stage and correct it.

As the one in command, yours is the challenge to challenge those whom you lead. They will rise no higher than the standards you set.

Flathatting offers death or disgrace. It cannot be tolerated, there is no excuse for it. Ours is the challenge to recognize it for what it is, and by abolishing it from our actions, keep others from falling into its dangers. Be more than a pilot—be a professional aviator.

An endorser to an accident report wrote what could be the epitaph for the tombstone of the flathatter, "He was a real tiger—all claws and no brains!"



Cat Run Collision

During the launch from a CVA's number three catapult the starboard wing of an E-1B *Tracer* struck the folded wing section of an RA-5C. The *Vigilante* was being taxied onto the number two catapult under the control of a flight deck director.

At the moment of impact the E-1B pilot heard a loud thump. No swerve or other abnormality was detected. After getting airborne he retracted his landing gear and began a port clearing turn. While rolling through 15 degrees of bank, the pilot felt his aileron controls binding. He experienced much difficulty leveling the wings because of the excessive control pressure required.

After leveling the wings, the pilot increased airspeed and began a gradual climb. Inspection from the cockpit indicated that the starboard wing tip was damaged. This information was passed to control. After climbing through 1000 feet, the pilot decided to use ⅓ flaps, as control binding was less severe in this configuration.

After leveling off at 2500 feet the pilot discovered that turns utilizing more than ten degrees of bank required extremely heavy control pressure to level the wings. During slow flight tests, lateral control with 2/3 flaps was possible, although very difficult. For this reason, no attempt was made to conduct slow flight with full flaps.

While awaiting instructions from the ship, the pilot sent his controller back to inspect the wing damage from the overhead hatch. He reported that a foot or more of wing tip and part of the aileron appeared to be missing.

Meanwhile the ship directed the pilot to proceed to the beach and attempt to land, utilizing the field arresting gear.

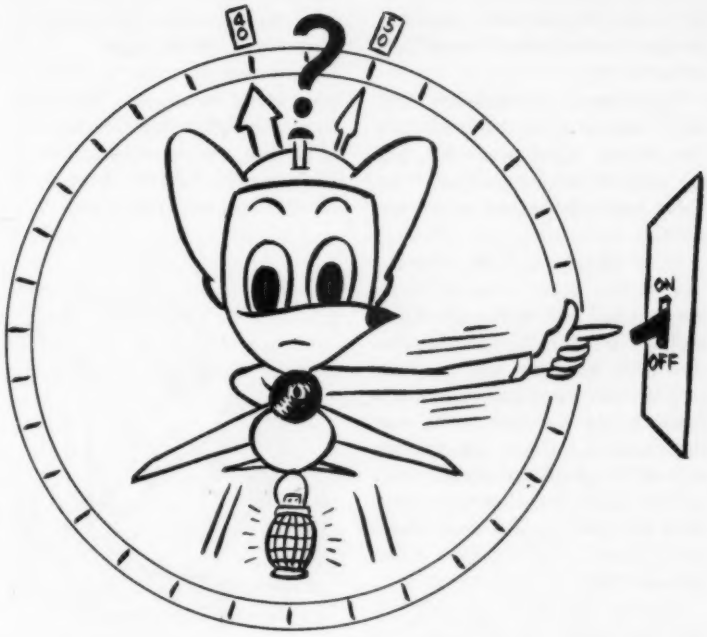
While enroute to the bingo field, the copilot took control of the aircraft for a few minutes while the pilot went aft to have a look at the damage. His findings confirmed those of the controller.

Wind at the divert field was 030 degrees, 10-12 knots. Either runway 9 or 13 was available for use. The pilot elected to use runway 9 because it had less crosswind and was longer than 13. The arresting gear had been rigged on both runways and the crash crew was standing by.

The pilot made a long straight-in approach using ⅓ flaps. He did not use the standard wing-down crosswind correction because of the angle of bank required. Instead he kept the aircraft crabbed into the wind and flew the approach at 125 knots. The aircraft touched down at 115 knots in a slight crab. The arresting gear was not necessary since the aircraft had slowed to taxi speed as it passed over the wires.

Thanks to the professional, standardized performance of this VAW-12 crew, an expensive and valuable aircraft was soon back in operation.

NIGHT BINGO



I departed Marshall with a fuel state of 1900 pounds in my F-8C. After completing a "speedbrakes up" tacan penetration, I was 100 degrees from the CCA final inbound bearing. CCA then gave me a turn to enter the pattern downwind.

While in a 25-degree bank turn at 1000 feet I was given the signal, "Bingo San Clemente Island, bearing 028 degrees, 72 miles!" Fuel state at this time was 1450 pounds. Maintaining my angle of bank, I turned to the 028-degree heading.

A recent F-8 accident suddenly came to mind in which a pilot flew into the water at night shortly after receiving the "bingo" signal.

Therefore, I was determined to cautiously perform one evolution at a time and fly strict instruments. Upon rolling out on a 028-degree heading, I raised the landing gear. With the gear up and at 175 knots, I lowered the wing and raised the hook.

Accelerating to 360 knots, I climbed to 4000 feet and had the cruise droop up. As I passed through 2500 feet, I dialed in the San Clemente tacan channel 50 and turned up the ID tone control.

Switching to Strike Control frequency, I called the ship. They told me to check my tailhook UP, lights bright and flashing and then passed me to "Zipper" departure frequency. I turned on my rotating beacon and checked the alignment of my RMI against the wet compass. Departure control told me to report when switching to Sam Clemente tower.

By this time I had a tacan lockon indicating 015 degrees at 56 miles. The ID tone was garbled and unreadable.

I double-checked the frequency of the San Clemente tacan in the Enroute Supplement and noted the ID as "NZ2." I was on my way: at 35 miles out I switched to their tower frequency and reported that

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

I was an emergency low state bingo from "Zipper" and requested landing instructions. I could see lights ahead.

The tower informed me that MLP was in progress and that the runway lights were out, but that I would have priority and the lights would be turned on for my arrival.

As I approached the western end of the island I couldn't see the runway and again asked for lights. The tower reported that the lights were on and the LSO said that he was flashing an Aldis lamp. I reported that I was over the flashing light at the western end of the island and still couldn't see the field. San Clemente tower then informed me that their island didn't have a flashing light at the western end.

Another squadron aircraft called and asked me if I was on channel 50. I was about to answer in the affirmative when much to my horror I noticed that the tacan control head outer dial was one notch off. I was on channel 40!

I remembered that channel 40 was San Nicolas Island since I had recently used this tacan while utilizing the Pacific Missile Range. I also remembered that the island had a runway long enough to accommodate an F-8 since drone aircraft were launched from this facility.

My fuel state was down to 750 pounds and I immediately switched to Guard frequency to call San Nicolas tower for runway lights. I transitioned to the landing configuration and turned the landing lights on.

I still hadn't heard from San Nicolas, but Pt. Mugu came up on Guard and informed me that they would get the lights turned on at San Nicolas for me. I assumed they had a telephone hookup. I reported that I only had a few minutes fuel remaining and to please expedite the lights.

I decided to make a series of low passes over the island toward the lights that I could see. I blinked my landing lights on continuously in an attempt to alert someone on the island.

My second pass at about 1000 feet I passed perpendicularly over a runway. I immediately turned left to parallel the runway but lost sight of it. I flew what I guessed to be parallel to the runway to the end of the island head 130 degrees. I executed a tight left turn back to a heading of 310 degrees and dropped to about 400 feet.

I saw the runway, but I was too high to dive for it. I made a slight right turn, determined to keep it in sight this time. As I flew over the end of the runway I went on the instruments continuing straight for 15 seconds. I executed an 80 degrees/260 degrees turn starting to the right.

Pulling out of the turn, I started timing again and slowly descended with the landing lights on. When 15 seconds were up the runway threshold was slightly to the right. I made a slight correction and touched down almost at the end of the runway.

I considered shutting down on the runway but rejected this idea in order to retain the landing light. I didn't drop the tail hook for fear of a wrong way engagement. I used maximum aerodynamic braking and opened the canopy at 80 knots, not really caring if I lost it or not. This improved visibility so that the remainder of the landing rollout was easily accomplished. It was determined later that I had stopped the F-8 in 3900 feet of runway.

My fuel gage read 150 pounds when I finally stopped the aircraft. I called airborne aircraft to relay my safe landing to San Clemente and Zipper. I then taxied to the ramp area using the landing light. As I approached the ramp, the lights came on and the tower gave me a call. On the ramp, I shut down the engine and headed for the coffeepot.

Obviously, this whole incident could have been prevented had I double checked the tacan control head setting. Since I received a rapid lockon and the bearing and distance information was reasonable (within 10 degrees and 10 miles from the ship's vector) I was satisfied that I had San Clemente and didn't double check the setting. You can rest assured that I will from here on. Also, I'm going to insist on a readable identification signal—before I completely trust my tacan. How about you?

Fixation

I was number three in a four plane division of A-4s scheduled to practice bomb on the Spar in preparation for an all-fleet shoot. Everything was going well until my third run—a pop-up/lay-down delivery.

As I started diving I noticed a glow in the fire warning light. No other indications of fire were evident and I thought that sunlight was reflecting off the bulb, causing it to appear lighted.

The persistent glow created doubts, however, and I became involved in checking out the bulb, utilizing the press-to-test feature. Thus engaged, I was not paying any attention to my altitude and attitude.

Suddenly I looked up to see the water rushing at me. Hauling back on the stick, I managed to drag the nose up, thinking all along that I'd "had it." As the aircraft buffeted from the acceleration of the maneuver, I thought that I had hit the water. The number four man told me later that he saw a "dish" in the water where I had pulled up.

Climbing through 2000 feet, I weakly informed the flight leader and the ship that I had a glowing fire warning light and was then visually checked for fire by another aircraft. The light subsequently went out and I returned aboard without further incident.

Don't go away: there's a moral here: When you are flying an aircraft, don't ever forget it. Don't allow an unexpected occurence to break your scan pattern. I am a fairly senior mouse with over 12 years of flying but my inattention in this case very nearly caused me to "buy the farm." The irony of it all was that I had just given a pep talk to the old slogan, "Flying is not inherently dangerous . . ." then I went out and got careless.

Needless to say, I downed the aircraft for inspection for overstress *and* a faulty fire warning light.

Head Out

While making an instrument departure (under VFR conditions) from an east coast NAS, the crew of an SP-2E nearly had one of those things that will spoil your whole day.

The departure involved a 175-degree port turn after takeoff, climbing direct to the VOR some 15 miles away.

Departure control indicated radar contact almost immediately after our liftoff and we began a port turn after cleaning up and reaching a comfortable altitude.

While climbing through 1500 feet in a standard rate turn, departure reported a radar contact at 11 o'clock. What caused the pilot to look out at the one o'clock position I'll never know, but his immediate reaction of pushing the nose over and leveling the wings probably saved us from running into the A-1E approaching from that direction.

The *Skyraider* was letting down for a downwind entry to the field we had just departed. The near miss was close enough to remind me of something that all pilots should remember: *keep your head out of the cockpit*—the other fellow might not.

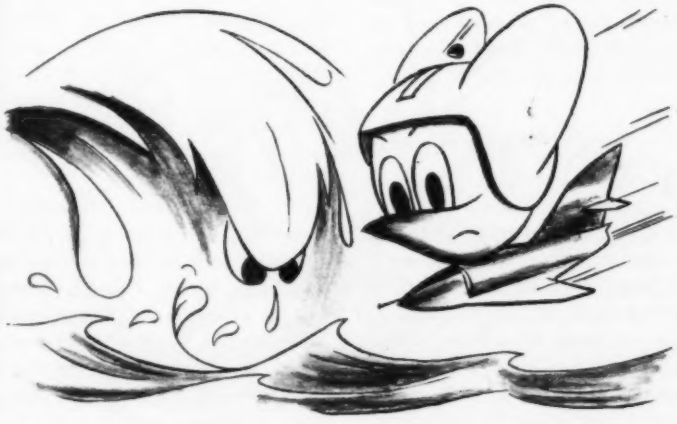
Mach One Bugsmasher

I had just reported to a new command and requested some flight time to meet monthly requirements. This request resulted in an invitation to accompany another pilot for passenger pickups at two civilian airports.

I had last flown as a qualified pilot in the C-45 about three years previous so I had a little experience behind me. I asked the pilot if I could help with the flight plan and if he had all the necessary charts. He said that it was all taken care of.

That should have been sufficient warning, but I badly needed flight time, so I threw professionalism to the winds.

The pilot was in a hurry to get into the air. After a "Mach 1" taxi to the turnup area, he saved more time by completely eliminating the check list. The runup consisted of jazzing the engines twice and a thumbs-up. We then whipped onto the duty and took off—this time without proper clearance. Once airborne the gear



failed to retract so we stayed in the pattern and returned to get another bugsmasher.

Off we went, again without check list or decent runup.

We were on a VFR flight plan utilizing random altitudes. About half an hour after takeoff we entered clouds and thunderheads. At this time my dauntless colleague complained that he had already flown eight hours today and that I should keep an eye on him. I got on the radio, desperately trying to get through the static for a clearance or a radar contact of any kind.

Eventually we spotted our first destination. We swooped in, picked up a non-aviator type passenger and took off, racing the thunderstorm to our next passenger stop.

After picking up our second passenger, we climbed out, still VFR, around the storm. Fifty miles out we were lost. I got on the radio again and asked anyone for assistance. The pilot became furious at me for doing this, then a short time later he became completely absorbed with his gyro compass, complaining that it was faulty.

As he fiddled with the compass, I took the controls and picked up some altitude to give us adequate clearance over some nearby mountains.

It had become imperative that we get a DF steer and radar position report, especially since we were boring holes in the clouds over the mountains.

The answer to my prayers came when an Air Force radar picked us up 75 miles north of our intended course. They gave us vectors to a clear area and we got home with no further problems.

I was amazed to learn that we had made the flight with only one ONC chart and a Flip Enroute Supplement. Not exactly my idea of the necessary charts, but evidentally considered sufficient by my pilot.

After securing for the evening my compatriot took off on a midnight date. I made a resolution right then to avoid flying with strangers again whenever possible.

Flap Trap

I had just completed the takeoff checklist including the selection of ½ flaps. Unfortunately, the A-4C flap indicator gage is in such a position that the tick mark (slightly below the ½ number) for ½ flaps is out of the pilot's direct view unless he leans forward. The result may be a selection of just slightly more than ¼ flaps. This is what happened in my case.

It was an 85° day and my A-4 carried two 300-gallon wing tanks plus a 2000-pound shape. I had estimated a 4200-foot takeoff roll (at ½ flaps). As I rumbled past the 6000-foot marker, the pucker factor began to build up considerably. Somehow I managed to stumble into the air a few seconds later with no more serious consequences than a thoroughly shook chase pilot.

My procedure now is to lean forward to get a good look at that gage when making a flap selection.

Flaps Again!

During an around-the-clock Weekend Warrior exercise, two *Stoof* drivers were requested to take an out-of-check S-2 on a test hop. The bird had been preflighted and about 10 linemen were on hand to aid the pilots; the excess personnel being from reserve squadrons, with station keepers instructing the new men.

Pilot's preflight inspection revealed nine inspection covers loose —four in each wheel well and one for boom inspection. After insuring the security of these covers, and carefully completing the preflight, the bird was started and the wings spread.

The flaps were ground-checked by numerous linemen, and following a thumbs-up, the pilots launched.

Takeoff, utilizing 1/3 flaps was normal with no unusual control pressures. The test hop proceeded normally until the slow flight characteristics were checked.

The gear and flaps were lowered, followed immediately by a scramble in the cockpit to control the plane. The flaps and gear were rapidly raised and the bird flew with ease.

Trying again, the flaps were gingerly lowered. Both pilots were able to maintain straight and level attitude utilizing full nose-down and a full right-aileron trim with the yoke full forward and twisted 135 degrees to the right. Under these conditions, they decided to make a landing, *sans* flaps, which they accomplished without difficulty.

Returning to the line and prior to folding the wings, the pilots signaled one disgruntled station keeper to check the flaps again. With apparent disdain, he wiggled the inboards. After checking the outboards, he departed with unusual alacrity for the maintenance shack.

He returned Jessie Owens-style with the maintenance chief in tow and two funny looking metal pins about six inches long. It seems that the pins had not been replaced following the check, and both outboard flaps were really flapping.

In spite of an unusually thorough preflight, and at least five

men per wing for the flap check, the absence of these pins was not detected. Everyone involved was embarrassed: the pilots for overlooking these items on preflight; the linemen for not checking the outboard flaps properly on the deck; and the maintenance department for forgetting to install the all-important pins.

The pilots expressed their gratitude to the maintenance department for omitting both pins. Had one been installed but the other overlooked, it is doubtful that the flight would have progressed much beyond a slow roll on takeoff. NATOPS procedure forbidding no flap takeoffs would have insured a most exciting experience.

Moral: Look for those connecting pins, don't even trust your mother when it comes to flying, and lower those flaps a leetle bit at a time when in the blue. . . .

Octifuguron

I was at 35,000 feet northwest of Dixieton in an F-8E. The autopilot was doing a fine job of flying first pilot except for turns —it wasn't feeding enough rudder into the turn. I decided to help manually.

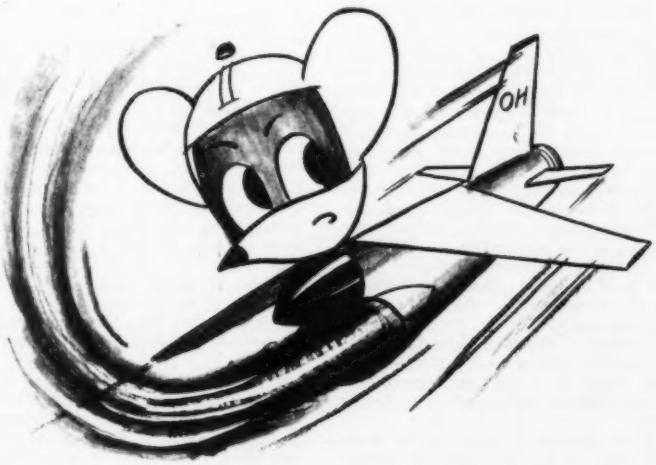
On the next turn I added a little bit of rudder and complimented myself for the excellent rate of turn I had induced. Glancing out at the opposite horizon, I suddenly noticed ground where there should have been sky.

During the next few seconds, the bird did a wild "Octifuguron." The right wing dipped drastically and at the same time the nose pitched to a 90-degree nose-down attitude. The tumble continued on both axes through a 90-degree nose-up attitude and stopped. The *Crusader* was flying right wing down—more backward than forward.

My hands were not on the stick at the time and due to the violence and speed of the maneuver, I was not able to grasp the control until the aircraft had recovered. The autopilot did all the work.

It appears that the F-8E flies almost as well backwards as it does forwards, although I can't confirm it as I won't be trying it again.

By the way, the ASO's recommendation is: "When on autopilot, use no rudder without turning the autopilot OFF and reengaging."



Hard to Convince

Shortly after the pilot requested takeoff clearance for a morning training hop, a crash truck crew on station at the approach end of the runway notified the tower that the TF-9J requesting takeoff had a flat port main tire.

The tower relayed the information to the pilot, but he replied that the tire was merely low and again asked for a clearance to takeoff. The tower rechecked with the crash truck and after being told that the tire was definitely flat, notified the pilot of the *Cougar* a second time.

At this point the pilot in question asked the occupants of another *Cougar* nearby to check his tire. They told him it was low. Then takeoff clearance was again requested—this time it was granted.

About 2500 feet down the runway, the port main tire separated from the aircraft, causing the pilot to abort, drop the hook and take the chain arresting gear.

At least three persons, including the pilot involved in this mishap, knew that the *Cougar's* port main tire was not properly inflated. Any argument as to whether the tire was low rather than flat seems immaterial to the fact that a takeoff was attempted with an aircraft that had a *known* discrepancy.

LIFE'S CHOICE

"The Lord gave us two ends to use;
One to think with, one to sit with.
Life depends on which we choose;
Heads we win, tails we lose."

Reader Questions Headmouse Answers

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Not Nylon

Dear Headmouse:

While deployed aboard a CVA one of our ordnancemen was plugging in the HVARs on an A-1H on the No. 3 cat. As soon as he finished the last plane for No. 3 cat he ran forward to No. 1 cat where another A-1 was taxiing into position with wings spread.

After pulling a no-voltage test he rested one hand (the one with the tester in it) against the bomb rack. While reaching for the pigtail to remove the shorting clip and plug-in, his right hand came close to a bare metal spot. An arc of static electricity discharged between his fingertips and the bare spot.

The man was wearing the new flight deck identification jersey (nylon type) DA-36-243-QM (CTM) 11290-C-62 and flight deck shoes. We do not know whether the static electricity was caused by the new jersey but it is evident that a potential hazard exists because of the relatively low voltages required to fire HVARs.

ORDNANCE MOUSE

▶ There are no nylon jerseys in the system. These jerseys are cotton/rayon backed material erroneously called nylon. The material has no static build-up like nylon.

From the information presented it is difficult to prove the spark was electrostatic or that it was discharged from the man to the aircraft. It could have been discharged from the aircraft to the man or even been an electromagnetic spark. The latter would be possible if radio silence as defined in NavWeps 16-1-529 was not being observed at the time.

NavOrd OD 10773 cites hazards to electro-explosive devices and makes recommendations regarding means of overcoming them. With respect to prevention of static discharges it states that personnel should not wear nylon clothing.

Very resp'y,

Headmouse

Circuit Breaker Life

Dear Headmouse:

What is the effect of repeated pulling of circuit breakers? Typical of this practice is the requirement the T-28 NATOPS Manual which lists as a pretakeoff check of the engine-driven fuel pump: "Pull the fuel boost pump circuit breaker at 1200 rpm."

Similar circuit breaker pullings are listed in nearly all aircraft checklists. Troubleshooting actions include the pulling of the breakers in the F-4 AJB-3A circuits, routine disabling of landing gear extension circuits and use of circuit breakers in special weapons loading checklists.

Is there an electrical degradation due to repeated pulling of circuit breakers?

Is there a mechanical degradation due to repeated pulling of circuit breakers?

If the answer to either of the above questions is yes, is there a requirement for programmed replacement of heavily used circuit breakers?

ELECTRONICSMOUSE

▶ Circuit breakers designed for use in aircraft electrical systems must meet the operational and mechanical endurance cycling tests and calibration performance requirements of the specifications. For example, the MS26576 (ASG) circuit breaker designed to meet the requirements of Mil-C-5809 requires 50,000 cycles under AC loads, 1000 cycles (inductive) and 5000 (resistive) under DC loads plus 10,000 cycles mechanically at no-load. Upon completion of the cycling tests, the same circuit breaker must comply with the calibration requirements specified.

Therefore manual cycling during preflight checks should produce no electrical or mechanical degradation to affect the performance of these circuit breakers.

Other than that which may be specified in the aircraft Maintenance Instruction Manual, no requirement is considered necessary for programmed replacement of frequently used circuit breakers.

Very resp'y,

Headmouse

Unsat P-3A Ladder

Dear Headmouse:

At about 0300 as one member of our P-3A crew was boarding the plane, the ladder became disengaged from its mounting when he was halfway up. The crewman fell about eight feet to the ground and was knocked out. A far more serious injury is possible from such a fall.

Here's a design deficiency in that only two Dzus fasteners held the ladder in place. In this case, unbeknownst to the crewmember these were not engaged.

It is suggested that a stronger clamp and locking device be provided on the ladder and so designed that it cannot be used unless it is securely locked into place.

Right now I am at 600 feet, short one technician and very tired. More occurrences like this and P-3A crews will be shorter on personnel than they are now.

ANYMOUSE

▶ Thank you for a fine report. This matter had been discussed at the Second Annual Navy Lockheed Aviation Safety Symposium held earlier this year in Burbank. As a result, NASC requested through Crossfeed (June 64) that operating activities submit deficiencies on the ladder attachment for investigation and possible action.

In the meantime, the following has developed. VP-8 letter of 17 Sept via FWAL and CNAL was forwarded to BuWeps by NASC on 20 Oct. BuWeps informed NASC on 5 Nov that ECP-175 had been submitted and Airframe Change 74 is in preparation. Delivery of kits will start in March 1965 at a rate of 20 units per month.

Very resp'y,

Headmouse

Life Vest Inflation

Dear Headmouse:

It has been noted with interest by this Command that the third pilot in "3 Who Pulled the Curtain," October 1964 APPROACH, apparently made a completely successful water landing after inflating his Mk-3C life vest while descending. On the other hand, the second pilot inflated his raft prior to contact with the water.

Considerable variances in water landing techniques are recorded by the 1961, 1962, and 1963 *Escape Summaries;* inflation of Mk-3C and raft while descending, inflation of the Mk-3C upon contact, and inflation submerged but before release of the rocket jet fittings. In no case has the inflation of flotation equipment caused serious entanglement with shroudlines. However, during that same period others have drowned with an uninflated life vest after an apparently successful ejection or bailout.

This Command would appreciate any recommendations or information you might have as to when the Mk-3C should be inflated during overwater bailout.

J. P. CULLEN
CO, VAP-62

▶ The following is quoted from a BuWeps letter to CNO on this subject:

"It was requested (by CNO letter) that the water entry procedures proposed by the Commander, Naval Aviation Safety Center (March, 1964) be evaluated and that the Chief of Naval Operations be advised of the results.

"The Naval Aerospace Recovery Facility, El Centro, under problem assignment issued by the Bureau of Naval Weapons (Feasibility of Life Preserver Inflation Prior to Water Entry During Parachute Landing) conducted 12 different test programs. These programs utilized equipment of various types for a total of 325 live parachute jumps. The results of these tests indicate the desirability of entering the water with as much positive buoyancy as possible. The inflation of the life preserver while still in the air provides this buoyancy and leaves one less step to accomplish during the first few critical moments in the water. *It should be noted, however, that this procedure applies to the Mk-3C and Mk-4 life preservers only, not to the Mk-2 mae west, which if inflated tends to suddenly thrust the subject forward in the harness.* This sensation was the cause of much concern to the test parachutists who are experienced and not easily alarmed. Considering the apprehension and inexperience of most aircrewmen concerning emergency egress, this sensation could contribute negatively to an extreme situation."

BuWeps has recommended that fleet units utilizing the Mk-3C and Mk-4 flotation garments be instructed in the inflation of this equipment prior to water entry. At this writing, CNO has given informal approval and the procedural changes will be channeled through NATOPS in the coming months. For a more complete discussion, see Personal/Survival Equipment Crossfeed 12-64.

Very resp'y,

Headmouse

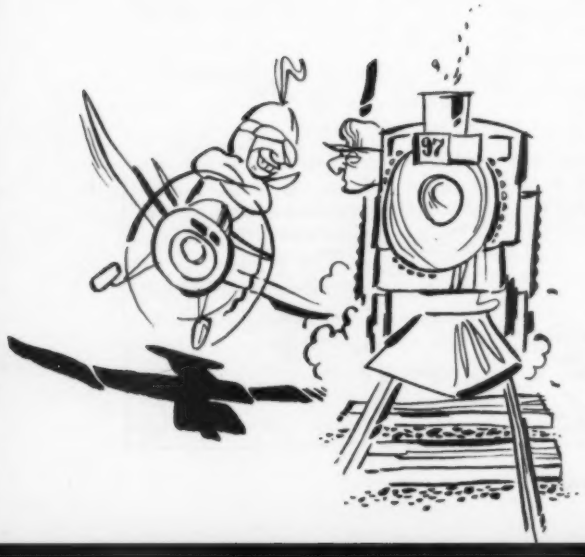
B.C. by Johnny hart

OL' JOHN WILL BE GLAD TO SEE ME. HE NEVER KNOWS WHAT TO DO WITH HIMSELF WHEN I'M AWAY ON VACATION.
I'M ALMOST THERE. ... STRANGE, ... I DON'T REMEMBER THAT VOLCANO. .... AND DIDN'T THAT CREEK USED TO RUN EAST AND WEST ?
.. NOT A CAVE IN SIGHT ANYWHERE, .. MUST HAVE FILLED THEM IN. IT NEVER FAILS,-
YOU GO AWAY FOR TWO WEEKS AND THEY CHANGE EVERYTHING AROUND.

The Last B

By CDR John Lavra, USNR
NAS Gross Ile, Mich.

I've flown 'em all from now to then,
The big ones and the small,
I've looped and zoomed and dove and spun,
And climbed 'em to a stall.



I've flown 'em into wind and storm,
Through thunderhead and rain,
And thrilled the folks who watched me roll,
My wheels along their train.

I've chased the steers across the range,
The geese from off the bay,
I've flown between the Princeton towers,
When Harvard came to play.

Bouquet

I've clipped the wires from public poles,
The blossoms from the trees,
And scared my best friends half to death,
With stunts far worse than these.

The rules and codes and zones they form,
Are not for such as I,
Who like the great wild eagles fling,
My challenge to the sky.

A bold free spirit charging fierce,
Above the fallow land,
And don't you like these nice white flowers,
I'm holding in my hands? . . .

For another viewpoint, please see "To be or not" page 10—ED

When engine trouble developed in an F-8 things went from bad to worse, forcing the pilot to eject. As is the case in all mishaps, the investigator's job—find out *why*? Here are the facts* leading to the

Most Probable Cause

As told by
LCDR Quentin E. Wilhelmi
NASC Accident Investigator

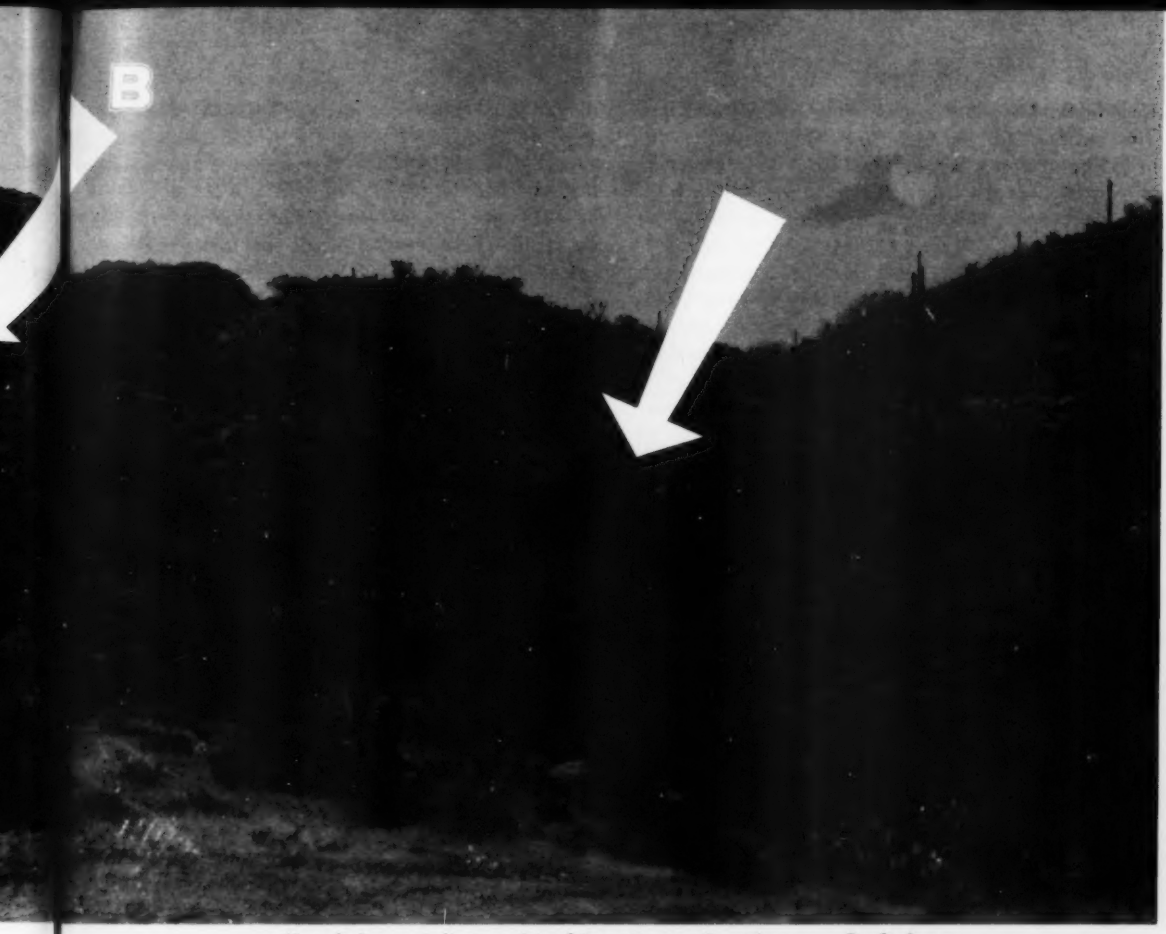
Pilot Blank ejected and received severe injuries. The aircraft received Alfa damage. Property damage was negligible.

The Investigation

a. Pilot Blank, in BuNo ———, and his wingman departed Station X at 1205T enroute to Station Y. At 1315T, while at flight level 390, Pilot Blank noted a dull vibration or rumble. This was followed by an oil pressure jump from 45 psi to about 52 psi (maximum allowed, 53 psi). All other gages remained normal. He checked his charts and noted Z airport as being the nearest field. The oil pressure increased to the upper limit and the vibrations also increased. He advised his wingman of his problem and attempted to diagnose the troubles. He reduced power to 80 percent before noting any decrease in oil pressure. The pilot then increased power to 100 percent and the oil pressure went to 60 psi. Throttle was reduced to about 90 percent but the oil pressure still remained about 1 psi above the limit.

Shortly, the pilot declared an emergency, reduced throttle to 86 percent and turned toward Z airport. The rumbles and vibrations increased in intensity and muffled explosions were also noted. Engine RPM started to fluctuate 3 to 4 rpm. This was followed by 2 yaws (not noticed by the chase plane). As Pilot Blank reached to disengage the yaw stab, he felt a violent explosion and noted blue smoke coming in the cockpit from under his seat. Believing he was on fire, the pilot shut down the engine and ejected at 30,000 feet. At no time did he notice any warning lights. The explosion was also noted by his

*Names, times, places are intentionally omitted or changed in accordance with rules governing privileged documents outlined in OpNav Inst P3750.6E.



Unmarked arrow indicates points of impact; arrow A, engine; arrow B, afterburner.

wingman who thought that Pilot Blank had used afterburner.

b. When Pilot Blank ejected he pulled the face curtain, heard the noise as the canopy left, but felt no ejection. Raising the curtain he saw that he was still in the airplane. The face curtain was then torn from his hand by wind blast. He attempted to pull the face curtain again but could not bring it into position. He reached for the alternate firing handle, pulled it, and ejected.

c. Pilot Blank has a total of 2416 flight hours of which 1064 are jet and 264 are in the F-8.

d. BuNo. . . . .was accepted on 5 March 1964 and had since flown 250 hours. It received a first Calendar Odd check on 24 August 1964. There were no airframe discrepancies noted in the work orders or yellow sheets pertinent to this accident.

e. The J-57-P20 engine, serial . . . was on its first service tour and had accumulated 121 hours since acceptance on 26 August 1961. The engine had been reworked on 24 June 1963 when the N-1 and N-2 compressors were replaced because of foreign object damage. The engine was returned to service in August 1963 and was again removed later that month for foreign object damage. From August 1963 until 24 August 1964 the engine was out of service. Repair was started 23 March 1964 and during this period the N-1 compressor was blended, the N-2 compressor and No. 3 bearing replaced and a major inspection conducted. On 26 August 1964 the engine was installed in BuNo . . . . . and operated 53.6 hours with no dis-

crepancies. The engine was repaired by the same Maintenance Unit in both 1963 and 1964.

f. The reason given for the long down time on the engine was the lack of spare parts.

g. Weather was not a factor in this accident.

The Analysis

a. BuNo . . . . . impacted the side of a mountain in a steep nose-down, nearly vertical dive. The ground was almost solid rock and the aircraft, as a result of the impact and subsequent fuel explosion, totally disintegrated.

b. The engine had been thrown out of the aircraft and was located 75 yards farther up the mountainside. All accessories and engine case were destroyed. Disassembly by cutting at NAS ——— revealed that:

(1) One of two required air seals (the aft) (PN M59056-258) was missing. This seal keeps 12th stage air from pressurizing the No. 3 bearing compartment. It could not be determined if the remaining seal had failed.

(2) The No. 6 bearing "last chance" strainer assembly (PN 313130) was not lock-wired and fingertight. The strainer nut had received impact damage. The strainer was clean.

(3) Bearing No. 2 had been heated to about 750°. There was some pitting of the races.

(4) Bearing No. 2½ had been heated. The case and most of the balls had been softened by heat and had been crushed by impact.

(5) Bearing No. 3 had failed. The rollers had been sliding and galling prior to impact.

(6) Bearing No. 4 had failed. The balls had been heated, softened and slipping. The bearing

Engine complete from N-1 to No. 1 turbine wheel

cage had disintegrated. The No. 4 bearing is a duplex bearing. This bearing had been mismatched, and the dash numbers mispositioned; that is, bearing serial No. 773J-2 was forward and serial number 805F-1 was aft. Information from Pratt and Whitney indicates that No. 4 bearing serial 773J-1 and 773J-2 was originally installed in this engine. Further information indicates that while the reverse installation of the bearing (-2 forward of -1) might not be critical, the mismatch of the duplex bearings most probably would be critical.

(7) Both No. 3 and 4 bearings gave indications of oil starvation.

(8) Metal found in the main oil strainer was found to be 60 percent steel, 30 percent brass and 10 percent other material (aluminum, paint, sand, . . .).

c. Pilot Blank complained of leg flail during the descent in the seat. Examination of the seat showed that the leg restraint lines had been drawn completely into the snubber units. Normally, after ejection approximately 10 inches of the line should be out. The retraction of the lines could have occurred in one of three ways: (1) the pilot did not connect his leg restraint lines to the seat; (2) sometime prior to the ejection the lines inadvertently were released by striking the release handle, or (3) the leg restraint strap ends were not fully seated. Pilot Blank states that he positively engaged the leg restraint lines.

Conclusions

a. The most probable cause of this accident is failure of the No. 3 and 4 bearings.

b. The mixing and reverse installation of the No. 4 bearing most probably caused its failure. Metal particles from the failing bearing contaminated the oil system and blocked the strainer. Oil would then by-pass the strainer and contaminate the entire system, blocking lines and causing lubrication system failure.

c. A possible cause of the pilot's leg flailing was due to the inadvertent release of the leg restraint lines caused by the pilot accidentally striking the release handle.

d. The most probable cause of the failure of the seat to fire via the face curtain method was insufficient pulling by the pilot.

Action Completed

a. The Maintenance Unit was briefed on the engine discrepancies. In reviewing bearing handling procedures it was noted that no records are maintained on bearing serial numbers when they are removed, replaced, or installed in an engine. This will be done in the future.

b. An investigation to determine the source of bearing serial 805F-1 and present location of the other half of the mismatched bearing set (serial 805F-2 and 773J-1) has been unproductive. The Commander of the Air Wing is continuing the investigation to determine, if possible, the location of the other set of mismatched bearings in order to effect their removal.

Recommendations

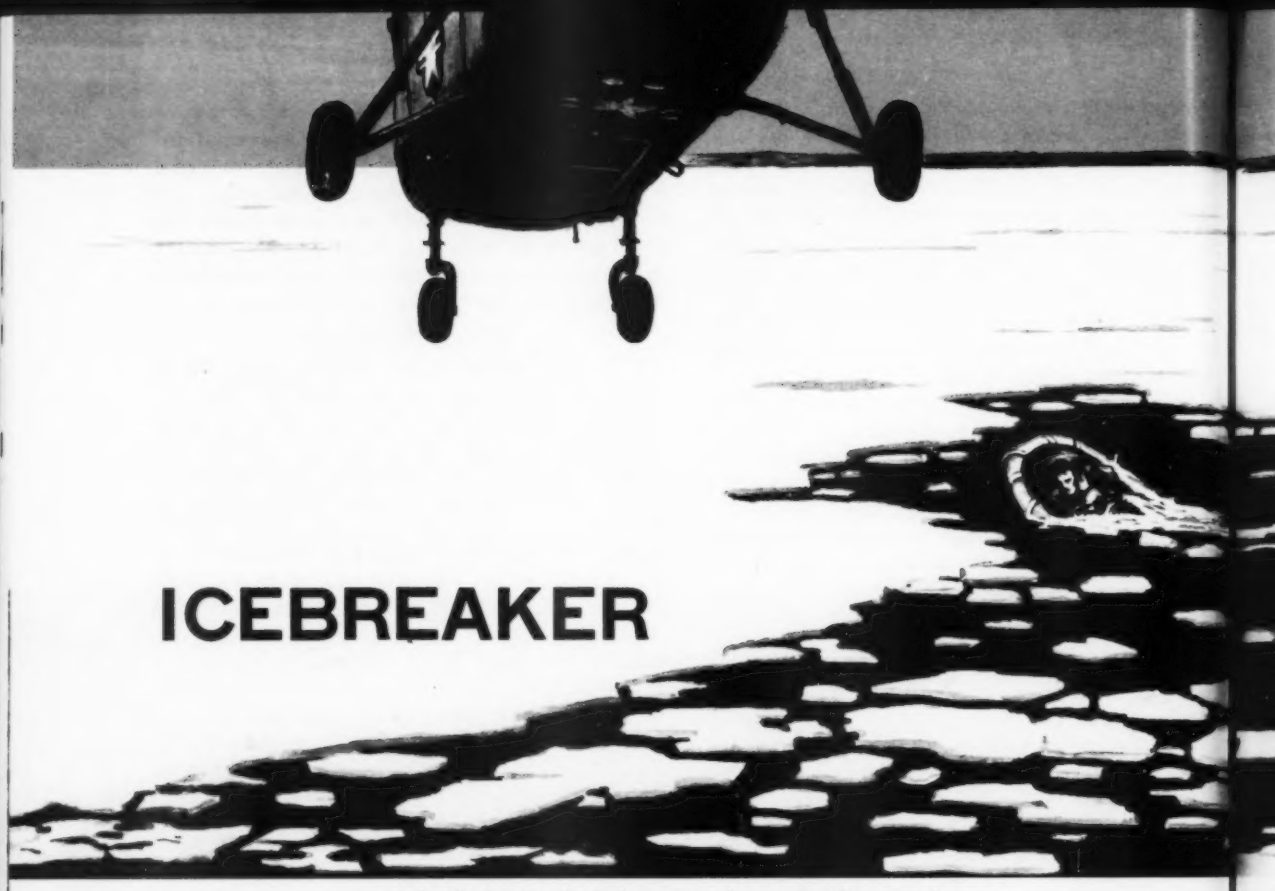
a. The instructions in the J-57-P20 Handbook of Overhaul Instructions (HOI), NavWeps 02B-10-ADE-503, Rev. 15 July 1964, for the removal or installation of duplex bearings are complete and contain caution notes concerning the dangers of mixing matched bearing details. NavWeps 02B-10-ADC-503 Rev. 1 Jan 1963 is the HOI for the J-57-P4 engine. This publication contains an additional warning concerning the mispositioning of duplex bearings. It was recommended that the Bureau of Naval Weapons authorize the following note from the latter to be placed in the appropriate sections of the J-57-P20 HOI.

Note: "Bearing details of recent manufacture have their respective installation positions indicated by the digits -1 and -2 following the serial number. Earlier bearings which are not so identified must be installed in such a manner that the detail bearing with the lower serial number is toward the front of the engine."

b. In the course of the investigation it was noted that each class C maintenance activity was responsible for the promulgation of engine repair (disassembly and reassembly) check sheets. It is recommended that BuWeps give consideration to the promulgation of a standard engine repair check sheet similar to the standard preflight and periodic checks now available for each aircraft.

c. In checking with another class C maintenance activity it was found that here also no records were kept of bearing serial numbers during their removal or installation. Pratt and Whitney Aircraft and both J-57 overhaul activities maintain records. It was recommended that BuWeps advise all class C maintenance activities to log the serial numbers of bearings whenever they are removed or installed in an engine.

Ed. Note: *Meanwhile, the search is still on for the other half of the mismatched bearing set (serial 805F-2 and 773J-1—actual numbers). Somewhere there is possibly another aircraft perhaps awaiting a similar fate.*



ICEBREAKER

I thought that the pilot had seen me and was making his approach.

An engine explosion was followed by a flameout as the pilot of an A-4E commenced a medium angle loft bombing run. At the apex of the pull-up he ejected. Parachute descent terminated in 33° F. water topped by two inches of slush ice. Air temperature was a cool 28° with a 15-knot wind.

To go back a bit, here is how he remembers the beginning of his adventure:

"A simultaneous muffled explosion and thump startled me and I was thrown forward against the shoulder harness. Instantly I knew I was going to have to abandon the airplane. The suddenness of the event coupled with a previously detected hum convinced me that I was now a glider and a very poor one at that.

"Immediately I commenced a zoom. Transmitted to my flight that I had suffered an explosion and was pulling up . . . that I had a flameout and was going to eject in the vicinity of the tidal islands in Chesapeake Bay. . . .

"Time was of the essence. I disconnected my oxygen hose from the seat pan and removed my mask. As stick pressures became increasingly heavy and being unable to trim, I realized that time had finally run out. Positioned myself in the seat with my feet on the floorboards, released the stick, and gave a hearty tug on the face curtain handle.

"My next sensation was one of elation as I was boosted clear of the airplane. No hesitation was noted during the face curtain pull and the ride up in the seat was a smooth steady acceleration. Near the apex of the seat trajectory, I became slightly disoriented due to moderate tumbling. Effects of wind blast were barely discernible during ejection due to the low airspeed at the time.

"Shortly thereafter, I realized the face curtain was still in my hand and threw it away. While still tumbling, checked for seat separation. Believe I saw the seat behind me. When separation had occurred, I became concerned about whether the chute was going to function. As I reached for the D-ring, I saw silk passing by my left thigh. Was both glad and

concerned—concerned because I thought my feet might get tangled in the shroudlines. Before I had time to give this prospect much thought, the chute opened and snapped me upright. The much-talked-about opening shock was mild in my case, something akin to a welcomed pat on the back.

"Sitting upright in my harness, I removed the D-ring from the sticker clip and put them in my pocket for safekeeping. Wanted to look up but couldn't seem to move my head back. Took off my helmet and hung it by the chin strap on my left arm. With the helmet removed, I was able to view the canopy. The risers were twisted behind my head. Before I was able to manipulate the chute, or maybe simultaneously with my attempts to do so, the risers unraveled. Took a look around and over my left shoulder saw a white puff of smoke which I assumed to have been caused by the explosion. Also saw at this time the dying gasp of a splash in the ice about 2 to 3 miles to the northeast from my position. Concluded this to be the splash of the airplane and was thankful that it had not damaged any property or persons.

"Saw from my drift that the probability of landing on one of the tidal flats was remote and released the left lower rocket jet fitting. As the seat pan swung around, I gave a tug on the yellow tab to free the line to the life raft. The hook near the tab, instead of pulling freely from its pocket, snagged and punctured the nylon cloth. This necessitated my picking up the seat pan with my right arm and, with my left hand, backing the hook out of the pocket. Releasing the snagged hook seemed to take too long. Momentarily I was concerned that I wouldn't get it hooked up properly before water entry. Finally was able to free it and hooked it to the lower right ring of my torso harness. This wasn't as easy as it sounds. You have to raise the Mk-3C life preserver up to see this ring. The hook was relatively large so that there was only one place it would fit with the rocket jet fitting still attached.

"After the life raft line was properly secured, I pulled the ring which opens the rear of the seat pan's survival section.

"I was still wearing my summer flight gloves and knew that once in the water use of my hands was going to be my biggest problem. I had a pair of survival gloves in the left lower pocket of my Mk-5 anti-exposure suit but did not attempt to put them on. They were size 6 and I wear size 10. They came with the suit. I was told there were no others available so I took them as they were better than nothing. I figured that if I ever had to eject over water I would use them to keep my hands warm once I had gotten into the raft. I tried them on when the suit was issued. Once they were on, had little use of my fingers. With all this in mind, I elected to wait until in the raft before attempting to put on the gloves.*

"Squared away for water entry, I commenced slipping the chute towards the main island below. The chute was relatively easy to manipulate. Oscillations were negligible. At an estimated 300 feet, I stopped the side slip and pulled the toggles on the Mk-3 life preserver. I inflated the life preserver because I knew that I was going to land on ice. The possibility of being knocked out or badly injured seemed rather great. Wanted to insure that I wouldn't be pulled under by the chute if I was unable to release the rocket jet fittings.

* The Naval Aviation Safety Center has written to BuWeps requesting that Mk-5 anti-exposure suit gloves be included in the Section H Allowance List (NavWeps 0035-QH-2).

"Water entry was made facing in the direction of the drift and I rapidly broke through approximately two inches of slush ice. I doubt if I submerged completely. If I did it was only momentarily. Prior to water entry, I had my hands near the rocket jet fittings. Immediately after I broke through the ice, I tried to release the fittings. When, after about three tries, I was still unable to release the fittings, I attempted to collapse the chute by pulling in on the lower risers. Throughout this time period, I was being pulled through the ice field by a 10 to 12-knot wind in a direction that was increasing the distance between myself and the shore line. With the life preserver inflated I was riding about chest high in the water and acting as an ice breaker. The ice didn't cause bodily harm or cut my anti-exposure suit. At one time I had the chute almost completely collapsed when a gust of wind filled it again.

"I stopped trying to collapse the chute and tried again to release the rocket jet fittings. After about two tries, I was successful in releasing the right fitting but due to the cross strap on the risers, the chute continued to drag me through the ice field. I looked at the left rocket jet fitting. It was packed with ice. My hands were beginning to feel the effects of the icy water. At that moment I realized that I had to use my survival knife and forget about trying to release the fittings. Withdrawing the knife from its sheath on the right side of the torso harness was easy. By applying a sawing motion, I was soon able to cut through the nylon risers.

"Free of the chute, I tried to put the knife back in its sheath but the sheath was full of ice and my hands, still in the summer gloves, were cold. I put the knife between my teeth, 'Tarzan fashion,' and busied myself with inflating the life raft. I soon had the raft inflated. It was soft but I figured this was due to the extreme cold. Climbed aboard with the seat pan still attached to my torso harness.

"Once in the raft, my main concern was to restore warmth to my hands. My wingman was circling me and I knew rescue was on the way. I waved at him once and thought that he must know that if I managed to get into the raft I must be in good shape. I tried to put on the survival gloves but with the gloves halfway on, I changed my mind and removed them as they were not comfortable. I took my summer gloves, squeezed the water out of them, and put them on. Within a short while the numbness began to leave my fingers as my body heat warmed up the gloves.

"Although I was sitting in ice water in the raft, and was rather cold about the lower torso and feet, I thanked God for taking such good care of me. . . .

"Tried paddling to the shore through the slush ice but without success. Then bailed out the raft, using my helmet, disconnected the seat pan and set up housekeeping.

"Soon afterwards I heard a helicopter approaching. I never thought to light a smoke signal as the helicopter appeared to be heading directly towards my position. Instead, I attempted to remove the seat pan by releasing the lower right rocket jet fitting. Like the upper left fitting, this fitting was packed with ice and refused to release. The few moments I spent trying to release the fitting which was submerged in the ice water in the raft resulted in rapid loss of what little warmth I had regained in my hands. I decided against any further attempts at freeing the seat pan as I wanted to be capable of making a successful hook up when the helicopter arrived. I believed that the added weight of the raft and seat pan would pose no problem to the rescue.

"The helicopter passed very close by my position and proceeded about 500 yards downwind. I thought that the pilot had seen me and was making his approach into the wind. Actually, he did not see me until he approached my position a second time.

"Upon sighting the raft the helo pilot rapidly approached my position, went into a hover about three to four feet above me and simultaneously lowered a makeshift rescue sling. I saw an extra hook on the terminal fitting of the hoist and attached my torso harness helicopter lift ring to the hook and was hoisted aboard. As I approached the hatch, the copilot helped me release my seat pan and raft.

"I attribute my successful ejection and rescue to training and prayer. . . ."

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"I ran into a helicopter."

Helicopter Seats

WHEN all four crew seats broke loose in a night water crash of a helicopter, three of the men were badly injured but survived. The fourth was lost.

- The pilot's seat came loose from the deck soon after the aircraft struck the water. He was thrown violently around the cockpit before finally coming to rest partly through the forward windshield with his legs inside the cockpit. He sustained a broken shoulder and multiple bruises and cuts.
- The copilot's seat broke loose after the aircraft first struck the water. He too was thrown violently around the cockpit and sustained facial cuts and other cuts and bruises which hospitalized him for four to six weeks.
- The first crewman's seat came loose in the accident. The crewman was thrown forward violently, striking the sonar panel. He suffered a severe cut of the left shin and other cuts and bruises as well as "chip" fractures.
- The second crewman was lost. He was sitting behind an empty "VIP seat." Undoubtedly, investigators state, at the time of impact, the second crewman's seat broke loose and was thrown forward. They surmise he was probably knocked unconscious and did not have an opportunity to escape.

This accident is but one of many in which helicopter seats broke loose in crashes in the past few years. As a result of a study of these accidents by the Naval Aviation Safety Center, the Safety Center pointed out to Chief of Naval Operations in July, 1963, that there was a demonstrated need for increasing the strength of helicopter seats.

The Safety Center's recommendation that helicopter seats be strengthened has brought results. In November, 1964, the Safety Center was informed that helicopter seats will be strengthened and that the improved seats will be available to the fleet in approximately mid-1966. Here is the text of the BuWeps message:

"NASC message (of 6 Nov 64) reiterated a need for increased strength of helicopter seats and CNO Message 162058Z (of Nov 64) requested information on progress of subject. In the past, seats were designed to withstand crash accelerations of 8 G's forward, 8 G's down and 3 G's laterally (8, 8, 3). These accelerations are less than those required for adjacent heavy mass items and less than human tolerance. They are also greater than those required by the FAA.

"As the result of several accidents involving seat failure, wherein the seat failure probably contributed to crew injury or fatality, action was initiated to increase the requirements for seat strength. Specification for new helicopters now require 20, 20, 10 strength. In addition, ECP's have been requested to determine the modifications required for seat installations in service and production helicopters.

"ECPs have been processed for the UH-2, SH-3 and CH-46 helicopters. ECP's are expected soon for the UH-1 and H-34 helicopters. It is expected that design and testing will be accomplished in approximately six months.

"Increased strength seat installations will accordingly be available to the fleet approximately mid 1966 allowing for negotiation of contracts and manufacturing and distribution of kits."

SWAMPFALL

After loss of power and a number of unsuccessful relight attempts, an F-8C pilot decided he had to eject. Here's his story:

"At this time I was over a large, densely wooded swamp. This seemed to be the best place to plant the aircraft without endangering any lives.

"As I passed over the northeast portion of the swamp, I began a port turn to place myself over a farmhouse and some open fields on the swamp edge. I informed my next reporting point I'd be ejecting and would give them a mark. Prior to ejection I tried one last time to relight.

"Went over in my mind what I'd do if the seat or parachute didn't work. Put my knee board in the forward section of the canopy. Tightened and checked all straps. Placed feet firmly in the rudder pedals and positioned myself firmly against the seat back. Informed my checkpoint in 30 seconds I was going.

"Ejection was at 5000 feet over farmland. No real jolt from the seat firing. Ejection seemed continuous and smooth. My first conscious thought after pulling the curtain was that I was doing a forward flip. Below, the aircraft canopy was falling to the deck. All of a sudden there was a jolt as if I had been hit by something. This must have been seat separation and chute opening. Then all was quiet. I was floating down to earth.

"Still had my oxygen mask on and was getting O_2 from the bailout bottle. The aircraft was gliding in a slight port turn from its original heading with the nose cocked up. The port wing dropped slightly and it continued left in a relatively flat attitude and hit. I saw the flash and knew it hadn't struck any houses.

"During descent, I released one side of my oxygen mask for fear I'd suffocate with the mask on if I lost consciousness on landing. I was oscillating moderately, but managed to slow this almost to a stop. At about 500 to 1000 feet, I could see I was going to hit in a heavily wooded area. Tried slipping the chute without too much success and continued to head for the trees at a pretty good rate of drift. Later found I had drifted 2½ miles from my ejection point. Could see I was going to hit a rather large tree limb so threw out my feet, struck and broke off the limb, and continued on to the deck. When I hit the limb there was a sharp pain in my right foot.

"Ground contact didn't seem hard at all. I hit alongside a fallen log about 18 inches in diameter and therefore did not roll.

"After having regained my senses, I released myself from the chute which was resting on the surrounding trees. Left the chute where it was as a marker. Removed my helmet but kept on my other flight gear for warmth and protection against insects and limbs. Took my day/night distress signal flares from my life vest and put them in an accessible spot. Opened the seat pack, removed the two flares, raft and poncho. Then figured I'd make my way to a clear area. I couldn't place any weight on my right foot so cut a sapling cane with my survival knife. Packed all my gear on my back and started out only to discover that the cane sank a foot and a half at every step and that I would have to cut my way through the underbrush.

"Returned to my original spot and set up camp. Inflated my life raft to lie in while awaiting rescue. Placed the poncho over several limbs to catch water should it rain and then began gathering wood for a fire. Besides the fire's signal value, the heat would feel good. I was wearing a summer flight suit and no flight jacket.

"Shortly afterwards, I heard jets. There was still a little daylight so I fired a day smoke signal. They were Air Force F-102's. They began to orbit. I lit off another signal flare to mark my position. The smoke from the first signal flare had really drifted! The aircraft remained overhead in orbit at about 500 feet until well after dark. They finally departed, probably because of fuel.

"A little while later I could hear prop aircraft approaching. As they neared, I lit off a night distress signal flare which I also used to start a fire in an area which I had cleared. As the sound of the aircraft came closer I could tell there were at least two helicopters. They passed within a hundred yards of me several times with their searchlights on but failed to spot my chute or my fire. . . ."

Search aircraft continued to orbit but apparently the crews did not spot the survivor. Rescue was finally made by a volunteer search party from the local area some four hours after the pilot had ejected.

Phase III

3M System

A new system of maintenance and material management is being introduced into naval aviation this year, sponsored and directed by the Chief of Naval Operations. This program is entitled "The Standard Navy Maintenance and Material Management System (Aviation)" and is known by the short title.

By LT Clifford M. Johns
Fleet Work Study Group, Atlantic

(Last of a series concerning the introduction of the new maintenance management system. The Oct. '62 issue featured Phase I and June '64, Phase II.)—Ed.

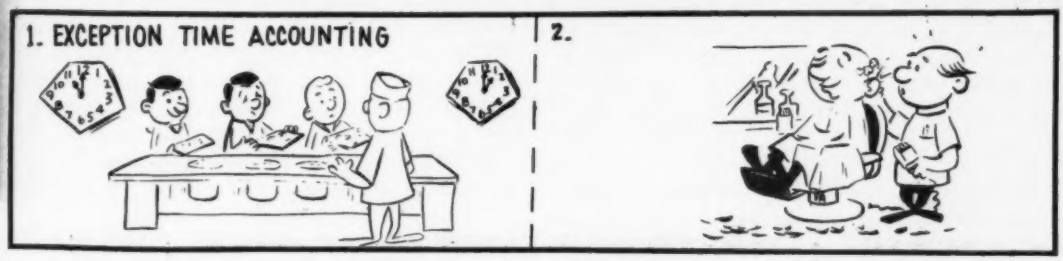
This system presents a new look at the management of human and material resources; its objective is to obtain the highest possible state of aircraft readiness and reliability at the lowest cost in men, money and material.

Historically speaking, the Navy got started in the development of the 3M System when early in 1962 the Secretary of Defense sent a memorandum to the Secretary of the Navy which stated that the Navy's aircraft maintenance compared unfavorably with that of the Air Force. SecDef suggested that the Navy might want to look into the Air Force system of maintenance management—the so-called AF 66-1 System. As a result the Chief of the Bureau of Naval Weapons wrote to ComNavAirLant suggesting that a trial be instituted of the 66-1 System in an Oceana-based unit. This was done and subsequently the test was expanded to include all squadrons at NAS Oceana and a MAG unit at MCAS Cherry Point. In 1963 CNO then directed that the entire Navy be implemented in the 3M System which was refined and developed based on the results of the Oceana test.

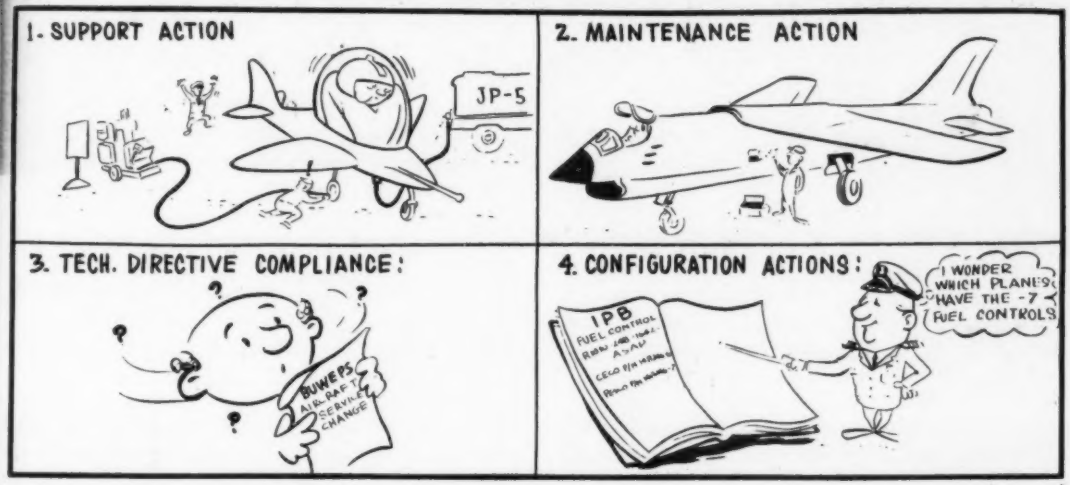
Basically, the 3M System provides for the accumulation, processing, and compilation (by Electronic Accounting Machines) of (1) Man-hour Data, (2) Maintenance Data, and (3) Aircraft Statistical Data. These three categories of vital management data, then, comprise the Maintenance Data Collection portion of the 3M System, or Plan "B" of OpNavInst 4700.16A (Plan "A" is the review, examination, and documentation of planned preventive maintenance under BuWeps Project Short'nin, such as Daily, Preflight and Calendar Inspections, and is not discussed

Data collected under the 3M System

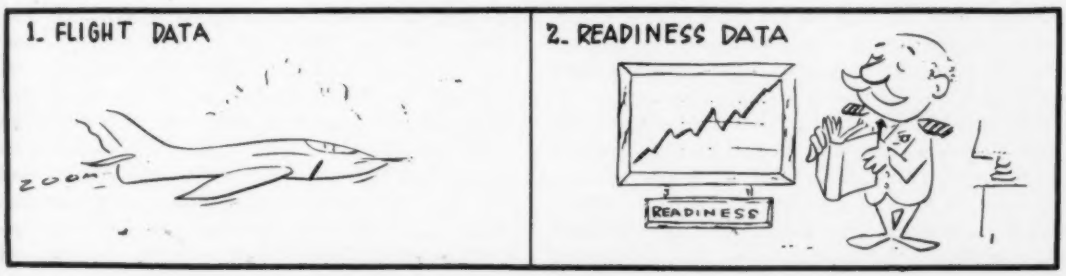
Manhour Data



Maintenance Data



Aircraft Statistical Data



in this article other than to state that this project is well along toward completion and constitutes a vital part of the 3M System).

Need for System

One of the first questions which arises when discussing the 3M System is, "Why do we need a system like this?" The answer to this question is perhaps best supplied by quoting CAPT E. M. Stever, CNO's 3M Project Chairman: "It's a question of increased complexity of equipment. Back in the 'good old days' the aircraft were relatively simple. They required little in the way of tools and test equipment for support. There was little paperwork. The increased complexity can be measured, among other ways, by studying the increase in electron tubes. A fighter aircraft had 10 electron tubes installed in 1941; its modern day replacement requires 580. The cost of aircraft has gone up from $250,000 (based on today's dollar values) to 3½ million dollars. Maintenance man-hours per flight hour has gone up from 15 to 63. While we have improved the performance of the aircraft, and, at the same time, increased its complexity, our ability to manage this hardware and simplify our paper work has not kept pace. We are using essentially the same system we had in 1941. This is why we are going into the 3M System—to more effectively manage our available resources."

Need for Reports

Now let's take a closer look at the 3M System and see what the units of the Navy can look forward to in the way of a reporting system. Basically, there are two types of reporting needed to make this system go. There is Man-hour Accounting for reporting man-hours available and man-hours utilized, and there is Maintenance Data Collection which reduces all maintenance actions to a format which can be key punched into EAM cards and processed by Electronic Accounting Machines.

Man-Hours Accounting

The Man-hour Accounting System defines for management the size of the labor force, and allows them to analyze the difference between assigned labor and available labor. We can tell for the first time where our maintenance talent is being utilized. This system, then, is really nothing more than a cost accounting system in man-hours rather than in dollars.

The Man-hour Accounting System is based on the "exception" principle. That is, each man assigned in the maintenance complex is credited with a bank of man-hours at the beginning of each reporting period. If this man is, let's say, an aviation mechanic and he is working in that field during normal duty hours the entire time, no action is required. However, each deviation or exception from the normal must be reported, i.e., he must report any time he is away from his work place, is working in other than his normal capacity, or is working overtime. When this reporting is done collectively—by shops—the supervisor of that shop is able, on a daily basis, to see the true manpower conditions within his activity. He is now able to accomplish effective manpower planning and programming. The maintenance manager is able to see, in addition, in summary form just what effect outside activities and obligations had on the performance of the maintenance mission.

Maintenance Production

Now that we are able to define what productive labor is available, next the manager wants to know what this available labor produced, and he wants to be able to technically analyze the hardware assigned. The Maintenance Data Collection System provides this information. It tells management what productive jobs were performed by the manpower available in each shop. Simply stated, this is maintenance production accounting.

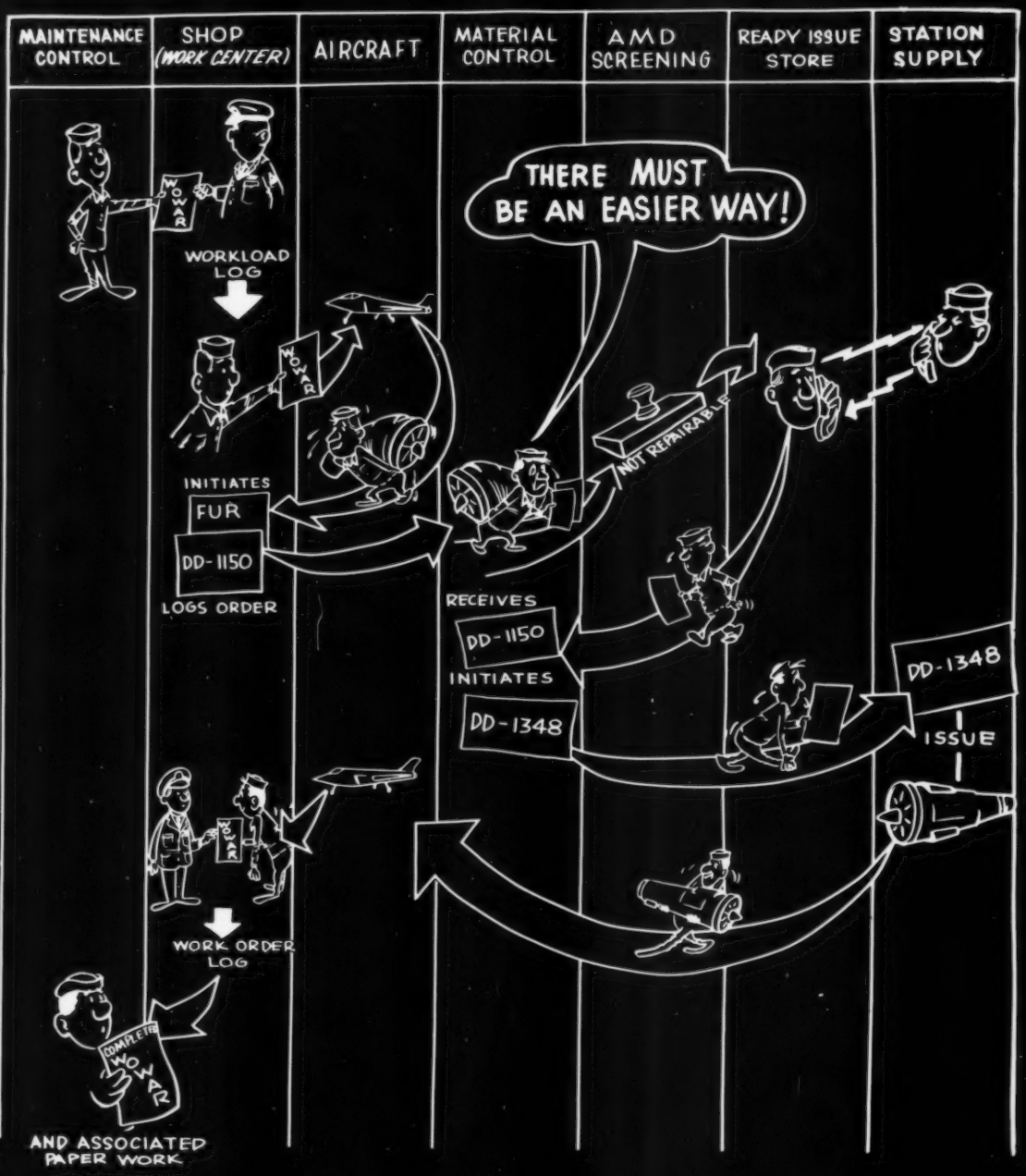
Data Collection

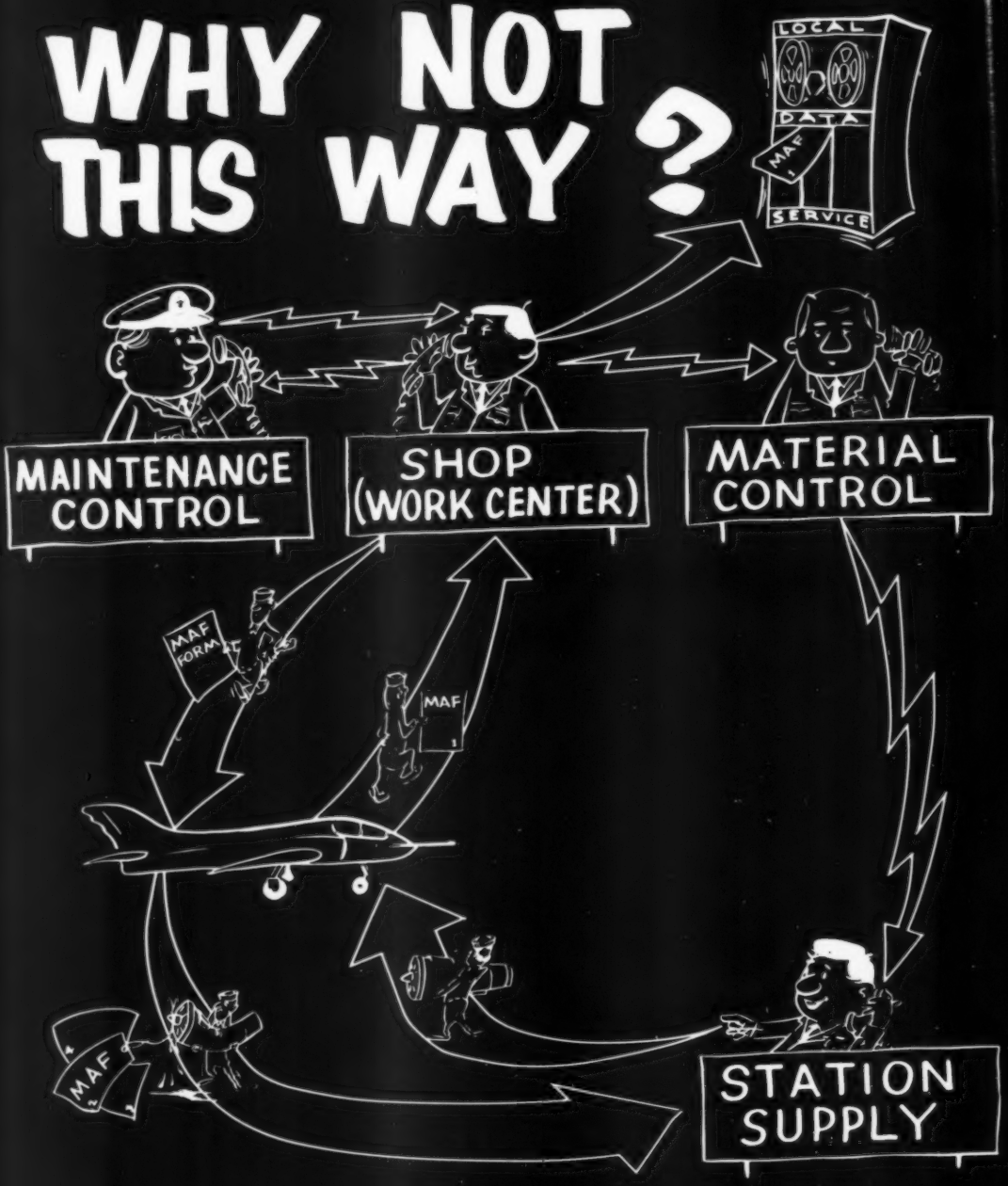
The raw data for the MDC System is generated at the most basic source, i.e., from the mechanic or technician who performed the maintenance task. Through the use of codes which can be extracted, key punched and machine processed, the mechanic tells us what equipment he worked on (which system, sub-system or component), how the malfunction or failure occurred, when it was discovered, what corrective action was taken to effect the repair, what parts were used in repair, how long the job took in man-hours, and what shop did the work. This information is recorded once (and only once), and from it can be compiled all material and man-hour data needed to effectively manage an aircraft maintenance organization. In addition, duplicate punched cards prepared by the data processing activity will provide information to the central data processing activity who will, in turn, compile feedback information required by CNO and the various technical bureaus and activities.

Data Usage

Under the 3M System there will be one central fund of maintenance data which can be drawn upon by all users eliminating the duplication now found in our manual reporting systems. It can be seen, then, that the 3M System provides management information at two levels—for the local manager in the operating unit and for the Type Command and Bureau

PART ACQUISITION




WHY NOT THIS WAY ?
LOCAL
DATA
MAF
SERVICE
MAINTENANCE CONTROL
SHOP (WORK CENTER)
MATERIAL CONTROL
MAF FORM
MAF
MAF
STATION SUPPLY

level. The system provides comprehensive data which, when properly analyzed and presented, forms the basis upon which timely, intelligent decisions can be made by the commander to reduce the demands upon men, money and material. In themselves, the reports generated by the 3M System are nothing more than a logical arrangement of facts. Human judgment must be exercised based upon these facts for the system to function as designed.

Local Management Aid

Specifically, the system can provide for commanders and managers factual, documented and readily accessible statistical information which can lead to answers to such questions as:

- How are my maintenance personnel being used? How much of their time is devoted to actual maintenance work?
- What shops are undermanned; or overmanned?
- How is supply responsiveness affecting my aircraft readiness rate?
- What maintenance skills are lacking or are in excess?
- What are the causes of work stoppage?
- What are the specific causes of low aircraft readiness? What components or parts are chronically failing?
- How closely does my unit approach the ideal of self-sufficiency?
- What is the optimum relationship between maintenance man-hours, flight hours and aircraft readiness in my unit?

These are but a few of the questions to which any good maintenance manager should be able to respond promptly and accurately. The 3M System will enable him to do so if it is properly utilized.

Well enough for the local manager, but for what purpose can this 3M data be used at the Type Command and Bureau level?

Top Level Management Aid

There are many excellent uses which may be made of this data on a fleet-wide basis. Some of the more interesting possibilities are: to establish realistic manning factors, to determine and revise aircraft inspection requirements, to establish time change requirements based on historical fact rather than on the manufacturer's estimate, to determine and/or justify the need for modifications and engineering design changes, to establish equipment reliability factors, to determine tooling and equipment requirements, to predict probable failures through trend analysis, to determine status of compliance with mission readiness type technical directives, and to update configuration status. However, it should be emphasized that once a reliable fund of data is available in depth the possibilities are unlimited—virtually any report concerning manpower or hardware analysis desired by management can be constructed.

Objective

In summary, the aims are to:

- Improve local maintenance and material management;
- Improve management and budget justification at department level;
- Improve aircraft readiness and utilization.

The newly developed 3M system appears to satisfy all known requirements for management of maintenance and material.

This, then, is a rather brief, overall look at the new 3M System for naval aviation which will be appearing in your unit soon. It is, admittedly, a rather complex, sophisticated system of management, but it is designed for a complex, sophisticated Navy. It is a system which will *not* replace good leadership, supervision or human judgment. But it most certainly *is* a system which, when properly understood, utilized and supported from the top, will assist management in the difficult task of maintaining a high state of material readiness, the ultimate goal of our modern Navy.

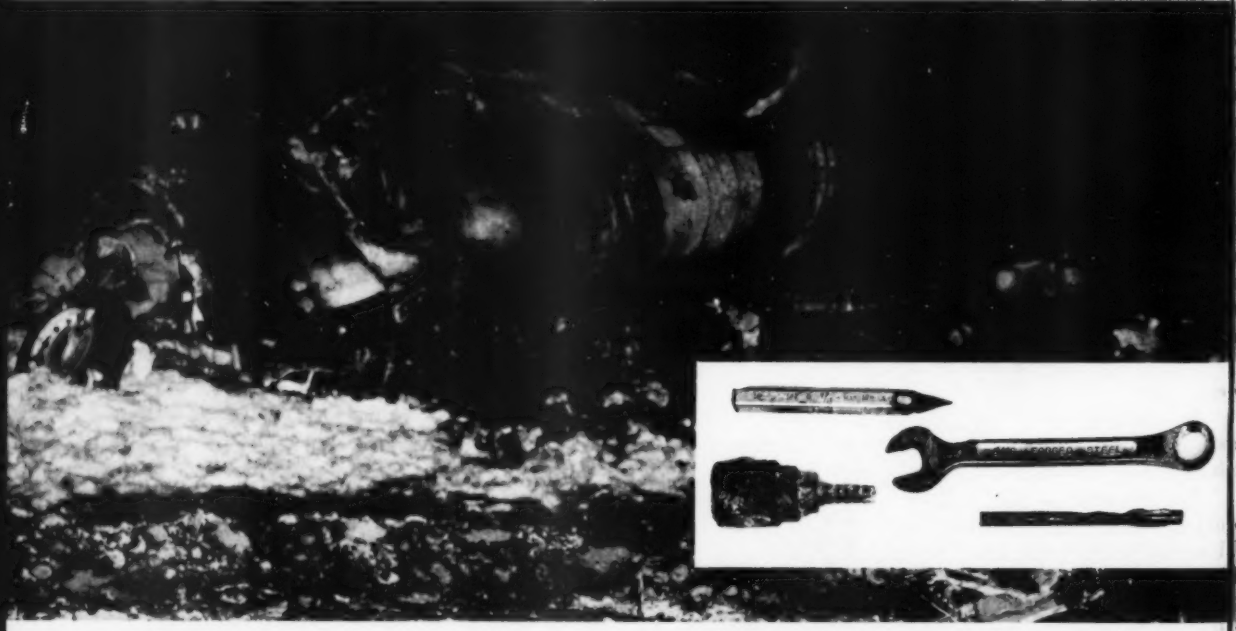
A graduate of the University of Missouri, Lieutenant Johns was commissioned in the Navy in June of 1956. After flight training, he was assigned to VAW-12, NAS Quonset Point, R. I., where he served as administrative officer for Detachment 48 aboard USS WASP. From 1960-1962 LT Johns was attached to Attack Squadron 15 and deployed aboard USS ROOSEVELT. Since that time he has served as administrative officer for Fleet Work Study Group, Atlantic where the 3M Project Center is located.

Declare War on FOD

Foreign object damage (FOD) as a subject for articles has been neglected in recent months, mainly because there is only so much of a message than can be delivered on the subject. Unfortunately, however, FOD is still with us and no doubt always will be in varying amounts, but let nobody tell you that it can't be reduced and then reduced some more.

A few years ago there were some who felt that the aircraft accident rate had been reduced about as much as it could be. But there were others who were convinced that the rate could be brought down, and down it has come. The trend is still downward.

Foreign object damage can likewise be reduced but only if more people become thoroughly convinced that it's possible. To make it possible, there must be a thorough knowledge of what constitutes foreign



"A wrench, a center punch, part of a screwdriver and an air hose connector were recovered from the wreckage. The presence of foreign objects adrift in the aircraft reflects a weakness in the comprehensive inspection upon the completion of each maintenance task and a weakness in the accountability of hand tools."—*from an AAR*

objects and strong desire to eliminate them. Since any improvement must be the result of many personal campaigns, let's start with the individual.

In my pockets are a pen, pencil, security badge, lighter, change, pocket knife, keys, and wallet. If I were working near a jet engine, any one of these items would become a foreign object if it fell from my pocket to the floor, the deck, or the inlet area of an engine. It would immediately become a potential means of foreign object damage. You no doubt have many of the same objects as I have in your pockets, plus probably a couple of favorite tools which you carry; therefore, you are an ambulatory source of foreign objects. Only persistent care or completely empty pockets will come close to preventing one of these things from damaging an engine some day.

That's not all, though. How about your hat or your jacket. More than one engine has made the long journey to overhaul because a hat was blown off a head, or a jacket was carefully laid near an inlet for just a second.

On the semipersonal level is the tool box. What a source of foreign objects! Everytime something is taken from it and not returned immediately after use, FOD potentialities climb sky-high. Engine after engine has been damaged with stray wrenches, screwdrivers and flashlights. Tools have been found inside engine cavities after hours of running time and many flights. Others have torn up expensive compressors on the first run.

Assembly materials have done their share to rip up engines, too. Pieces of lock-wire, nuts, bolts and washers are perfect foreign objects. They are small, easily dropped, and easy to overlook. There may even be a tendency to become complacent about them at times and that's when the damage curve starts its insidious climb.

Engine parts themselves are good sources of foreign objects, especially if assembly is faulty.

Natural phenomena may also take their toll. Hailstones banging into compressor blades and ice breaking off the inlet surfaces do a good job.

Basic engines aren't the only victims of foreign objects—lube and fuel tanks get their share, too. Under the right conditions, clogged lines and fuel or lube starvation is bound to occur.

There should be little doubt as to what constitutes foreign objects. Actually a foreign object may be anything—anything that can pass through a compressor or turbine rotor or find its way into a sump, a fuel tank, or a lube tank with the potentiality of causing damage to the engine and its components.

How can foreign object damage be eliminated? First, everyone must become thoroughly convinced that it can be eliminated. Then thousands of personal campaigns against FOD must begin. There can be no FOD if there are no foreign objects.

Tools must be checked and rechecked; nuts, bolts, washers, bits of lock-wire must be kept off the floor, the deck, the runway areas, any place where there is even the slightest possibility that they might get into an engine.

Personal belongings must be carefully guarded, even to the extent of emptying pockets before approaching an engine. Nothing must be placed near inlets of engines which could be forgotten—pilots' helmets and clipboards have been sucked into inlets, too.

Flying around or under icing conditions, and reducing speed through hail storms are about the only solutions to beating the natural phenomena.

Let's begin now and let's work together. You figure out effective ways to beat FOD, let us know about them, and we'll spread the word.

Complacency has no place in the program. The attitude of letting Jack do it won't work. Declare war on FOD now.—*GE "Jet Service News"*

Lost and Found

"Pilot lost his flashlight red lens and screw cover in the cockpit. This was noted on the yellow sheet; however, the objects were not recovered nor had the discrepancy been signed off.

"During inspection of recovered control systems, a binding was noted in the right-hand aileron power control assembly. Internal marks in the unit indicated that foreign matter was in the unit during the pre-accident period.

"The cause of this accident is undetermined. Evidence indicates pilot probably encountered a control problem immediately after becoming airborne. Two areas suspected in this regard are the flashlight components left in the cockpit and the binding in the starboard aileron power assembly.

"Anytime gear or tools are lost in the cockpit or other vital areas, the aircraft should be downed and a thorough inspection made prior to further flight."—*From an Accident Investigation Report by LCDR R. Carson, NASC.*

Gasket Installation

The Situation—During trial flight tests, radio communication between the aircraft and ground stations was so noisy as to constitute a definite flight hazard.

In approaching the problem, technicians gave priority to examining areas that in previous situations of a similar nature had revealed the cause of radio disturbance. They examined junction boxes, connectors, terminal strips, which often contained loose metallic objects (hardware, wire clippings, bits of solder) that short out circuits momentarily. Ground connections were cleaned and all other circuit connections and control equipment contacts were inspected for corrosion, poor soldering, loose terminals.

The Hazard—Finally the trouble was located in the powerplant fuel and oil lines, several sections of which were discovered to be insulated from ground, and others had extremely high resistance. This condition was unusual and misleading, as the metal lines were joined to grounded equipment by metallic connections. There was no reason to suspect that a continuous, low resistance path to ground by way of the fluid lines did not exist. It was only after tests were made of voltage drop across the connections, that the cause of the trouble was located. In nearly all cases, electrical resistance was so high as to practically prevent the flow of current. This condition forced current to seek indirect paths to ground causing noise producing voltage fluctuations. Furthermore, wherever arcing occurred because of imperfect electrical contact between structural parts, for instance, it too caused electrostatic noise in the radio.

An additional hazard existed in the possibility that fuel lines being ungrounded might cause static charges to build up and arc across to grounded objects.

The wrong kind of gaskets installed between the flanged connectors caused the trouble. The gaskets were manufactured of anodized aluminum alloy which, because of the insulating qualities of the anodic film, were in effect, non-conductors.

The Fix—Gaskets made of low resistance conductive material solved the radio noise problem—*Flight Safety Foundation, Inc. Design Note 64-3*

HURRY IS THE MOST—Fire damage resulting from the application of fuel pressure to the nozzle before it was properly locked to the receptacle. Faulty and worn nozzle allowed fuel to escape into the vicinity of the hot engine and brakes.

Cotter Pin Missing, Again

DURING a night flight about 150 miles off the west coast the mixture control to No. 1 engine became disconnected. The engine remained in the 10 percent lean condition regardless of the cockpit control position.

It was determined that a new carburetor had been installed on the P-boat about three weeks previous to this incident during seaplane ops alongside a tender. Since this was the last time maintenance was performed on the carburetor it is believed that the cotter pin securing the nut and bolt combination connecting the mixture control arm was omitted at that time.

The Anymouse involved in this incident recommends that quality control inspectors thoroughly check power plant controls linkages for proper security following correction of a discrepancy. He also recommends that self-locking castellated nuts be used in these locations so that in the event the cotter pin is omitted the nut will not vibrate off.

Headmouse strongly endorses Anymouse's recommendations.

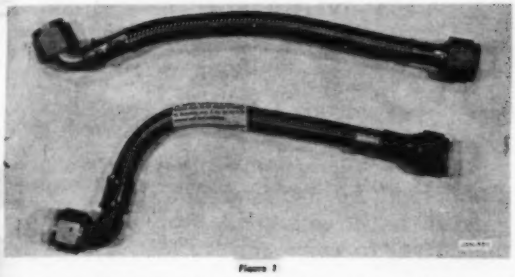


Figure 1

Formed Hoses Not to be Straightened

THE MESSAGE on the tape wrapped around the bottom hose in Figure 1 states: "This assembly is preformed to approximate installed shape. Do not attempt to straighten. Restraining wires, if any, are not to be removed until final installation." The top hose is a similar one which has been straightened.

Figure 2 shows what happened in the straightening process. The white inner liner is badly crimped while the black liner is also crimped to some degree.

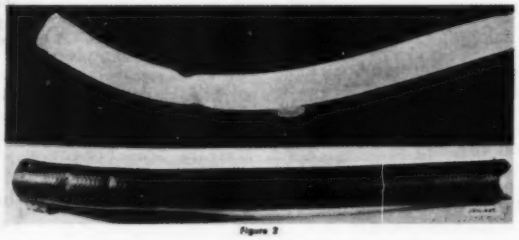


Figure 2

Such crimping tends to weaken the liner walls and presents restrictions to full smooth flow through the hose.

The following five rules should be strictly adhered to when handling engine fluid lines:

1. Don't exceed bend limits.
2. Don't exceed twisting limits.
3. Don't straighten a bent and set hose, whether preformed or set from usage.
4. Don't hang or support objects from a hose.
5. Don't stand on, pull on, or lay objects on a hose.

—GE "Jet Service News"

Ruptured Fuel Hose

FUEL flow on one engine of a military aircraft increased during cruise at 32,000 feet until it reached 2500 pounds above the other engines. All other engine instruments were normal. Before a landing could be made the engine burst into flames which engulfed the entire pod. The engine was shut down and a successful landing was made. Investigation revealed that the fuel hose assembly had ruptured, allowing raw fuel to enter the forward compressor section.

Mechanics are reminded that particular attention must be given to the proper alignment of high pressure fuel hoses. They are very susceptible to failure when twisted during installation.— *FSF Aviation "Mechanics Bulletin"*

Fuel System Murphy

DURING a local training flight, the fuel dumping system of a *Willie Victor* (EC-121P) was checked for proper operation. Maintenance had just repacked and reinstalled the dump valve actuating cylinder for No. 3 and No. 4 tanks.

When the system was actuated, tanks three and four failed to dump. The other tanks dumped normally. The fuel dump selector valve was then CLOSED and at this time tanks three and four began dumping. Unable to secure dumping, the pilot elected to continue dumping the tank to standpipe level prior to landing.

Postflight inspection revealed that the flexible hydraulic "closed" and "open" lines had been *reversed* when the actuator was reinstalled.

This squadron has taken the following action to prevent recurrence of this Murphy:

- Painting the "closed" line B-nuts to the actuating cyclinders and corresponding hydraulic fittings red.
- Conduct a ground fuel dumping systems checkout in accordance with the HMI whenever maintenance has been performed on a component of the system.

CONTRIBUTED BY CDR D. R. HORNBECK
VW-11 SAFETY OFFICER

*** If an aircraft part can be installed incorrectly, someone will install it that way!**

Letters

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Murphy List

St. Louis, Mo.—"Murphy's Law" in the November 1964 issue was of particular interest to me because of my interest in human error.

I am presently engaged in the implementation of an in-house human error prediction and reduction effort at McDonnell.

In order to predict error rates (or maintenance task success), it is necessary to have some idea of the frequency of human-induced malfunctions associated with a particular maintenance action. This information is obtained by tabulating as much descriptive human error data from as many sources as possible.

I would appreciate being put on the distribution list for all reported "Murphy" conditions, *irrespective of the type of aircraft or subsystem involved.*

B. J. COHEN
SR./ENGINEERING PSYCHOLOGIST
MCDONNELL AIRCRAFT CORP.

• Murphy Lists are on the way.

Automatic Igniters

Cecil Field—Has the Safety Center ever looked into the feasibility of continuous ignition in jet aircraft while in the landing configuration?

A recent F-8E flameout aboard this ship started the thought moving. The aircraft flamed out as it approached touchdown and after hook-skipping three wires the pilot ejected as the plane went off the angle. The cause, of course, goes undetermined due to loss of the aircraft; but most people would agree that it sounds like a momentary loss of fuel to the engine (fuel was observed coming out of the tailpipe as the plane "fast-taxied" up the deck and off the angle). It would seem to appear that air (due to approach speed) and fuel were available to the engine almost immediately after it flamed out; the only missing ingredient for fire being the ignition.

The only means available for the pilot to get ignition in the landing configuration in the F-8 is to insert a finger into the throttle quadrant and depress the ignition micro-switch, thereby obtaining 30 seconds worth. This is makeshift at best, very hard with winter (poopy-suit) gloves on, and to the best of my knowledge is nowhere officially recommended by the Navy.

What, if anything, has been done, said, or considered about such a project?

N. R. GREEN, JR., LTJG
VFP-62

• Yes, continuous ignition possibilities were explored for the J-57 engine as early as March 1963. NASC recommended that pilot selective continuous ignition be installed in the F-8.

At that time, several flameout sensors (automatic relight actuators) were under development and action on the Safety Center's recommendation was withheld pending the outcome of these efforts.

BuWeps studies made of inflight flameout problems have shown that an automatic relight device is more feasible than continuous ignition because:

- **Development of additional ignition components is not required.**
- **A saving in weight and cost is realized.**
- **In case of the J-79, it eliminates the necessity for continual actuation of the single ignition circuit.**

NATC evaluations during late 1963 and early 1964 indicated that:

- **The unit operated satisfactorily for 161.3 hours.**
- **Spark igniter service life under normal operating conditions was not significantly decreased by incorporation of the detector.**

During February of 1964, service tests of 10 sensors on 5 F-4 aircraft and 12 sensors on 12 F-4 aircraft were initiated. The results of these service tests appear to have been satisfactory to date, and BuWeps has requested a formal report from each evaluating activity concerning the results of these tests, prior to procurement of the sensor unit.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

Unlatched Safety Door

FPO, San Francisco—Recently one of our A-3B crews ran into a situation that could have proven very disconcerting, to say the least. It started as a routine ferry flight of an aircraft to PAR. The aircraft experienced some electrical difficulties while in the line so an electrician was called to investigate.

After checking the aircraft circuit breaker panel (located in the companionway) he came up forward to report his findings. However, he allowed the companionway safety door to close slowly rather than with the usual spring-propelled forceful slam. The aircraft left the line and proceeded on the hop as planned. Prior to landing the escape chute doors were blown open, as is usual on a PAR ferry flight. However, imagine the chagrin of the crew when they looked down what should have been their escape route, and saw their way effectively blocked by the safety door. Seems that the door never did latch in the up position, and the suction created when the escape chute was blown was suf-

ficient to pull and hold the safety door down. Luckily, this was just a test firing of the escape chute, for if it had been the real thing successful escape would have been doubtful.

Our squadron now has adopted the procedure that the safety door will *always* be checked for positive latching after anyone comes through the companionway. It is recommended that all other A-3 squadrons pass the same word out to their crewmen and maintenance personnel.

LCDR G. R. BELL, USN
ASO, VAH-4

A City Sleeps . . .

FPO, San Francisco—After seeing the cover of APPROACH for December 1964 I had to write a short note. In my opinion the cover with the caption was the finest I have ever seen anywhere. It is a beautiful tribute to the men of the Armed Forces of the United States throughout the world. It is a shame that the same cover could not be featured on a national magazine. Again, my congratulations on the choice of the cover for the December issue of APPROACH.

DOUGLAS H. PAWLING
1/LT, USMC, HMM-162

• Thank you for the fine bouquet. APPROACH is most appreciative that you took the time to let us know that you liked it.

Of Locks and Things

Washington, D. C.—Re: "Before the Fix Is On," I believe that even though the information presented was both outstanding and accurate, an error of omission was made. The article implied to me that the FUR reporting system is the only means of input to BuWeps to get RDT&E design changes.

In my opinion, letters from operating activities to BuWeps recommending airframe changes and accompanied by supporting technical data are one of the most effective means of improving design, operation and maintenance of aircraft systems. The fleet is blessed with many sharp, experienced, maintenance personnel, who can spot potential troubles in any given system before the troubles fully develop.

I'm not suggesting that squadrons devote a lot of time to systems design and deluge BuWeps with letters. Squadron workload is bad enough, at all echelons as it is, and BuWeps workload is just as bad. However, squadron efforts in the past have resulted in safety improvements in many areas.

Example: VF-21 recommended adding a nose strut extended pressure sensing and warning light system to the F-4 aircraft to preclude nose strut explosion on landing, and submitted full data on how to accomplish this change. The specific suggestion was not adopted. But the letter and data resulted in several NATOPS changes to amplify information concerning the nose strut extension system and its relation to the approach lights and angle-of-attack indexer. A positive safety improvement resulted. Total time from receipt of the letter to complete dissemination of the pertinent information (via message) was eight days.

The point of this letter? Many squadrons don't like to get involved with extra work by writing letters to BuWeps and having to obtain or create technical data. But if we have to wait long periods of time to accumulate reliability data (sometimes from accidents) before we know we have a problem, everyone is behind the eight-ball. Are we missing a bet?

Z. J. KOWALSKEY, JR., LCDR
BUWEPS (RAAE-525)
F-4/F-8/F-111 ELECTRIC SYSTEMS DESIGN OFFICER

• Well put, sir. While the article emphasized prompt and proper reporting of failures so that remedial action could be taken, it is agreed that the most opportune time to lock the stable is before the horse is stolen.

Please add VA-144 to the Honor Roll for distinguished safety achievement in fiscal 1964 (Ref. Nov 1964 APPROACH).

Offers Control Lock Device

Fort Bragg, N. C.—In reference to letters, November APPROACH, concerning the use of a screwdriver to hold elevators in place while work is being performed, here's an item which may possibly save a few bent birds after a screwdriver is forgotten.

Similar to gust locks these can be fabricated by any sheet metal man in a few minutes.

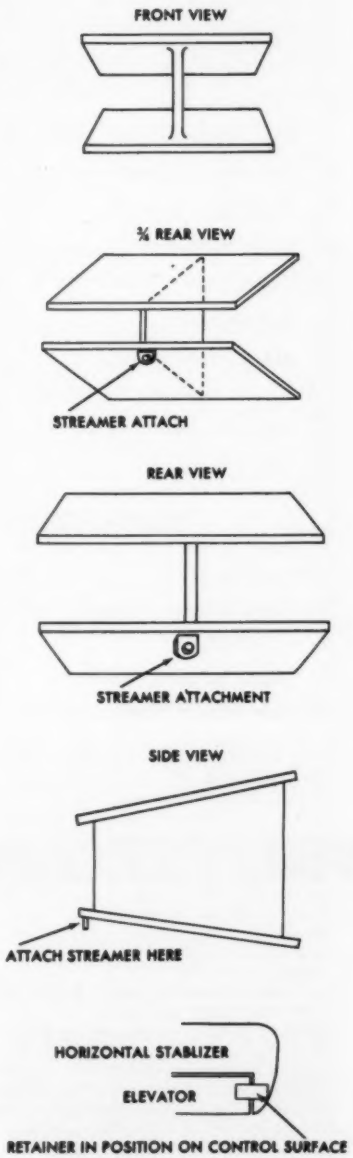
Hope this will be of some help to our brother aviation types in the Navy and Marine Corps.

RICHARD A. DEL CONTE, WO
3D SPECIAL FORCE GROUP (AIRBORNE)

P.S. Enclosed you will also find a check in the amount of $3.50 for a year-long education in Aviation Safety from APPROACH.

• Thank you, WO Del Conte. Your drawings are offered as a hint to operators using screwdrivers and vice grips. Your subscription order has been forwarded to the Superintendent of Documents, Washington, D. C. 20402.

DRAWINGS ARE NOT TO SCALE



approach Vol 10 No 8

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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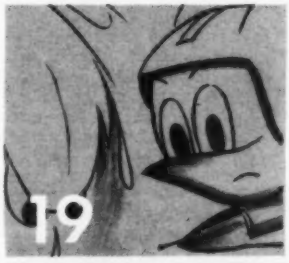

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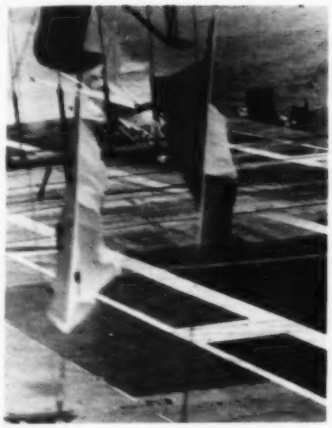
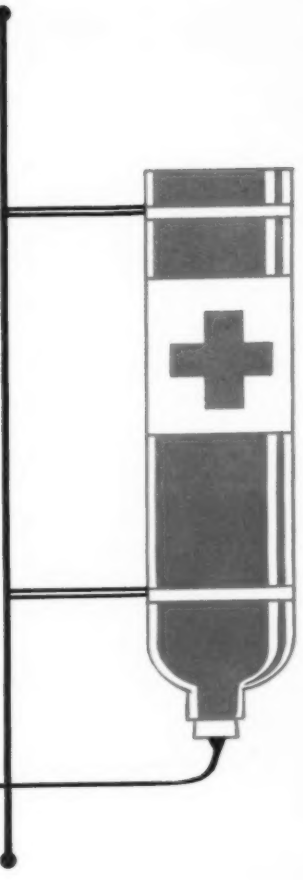
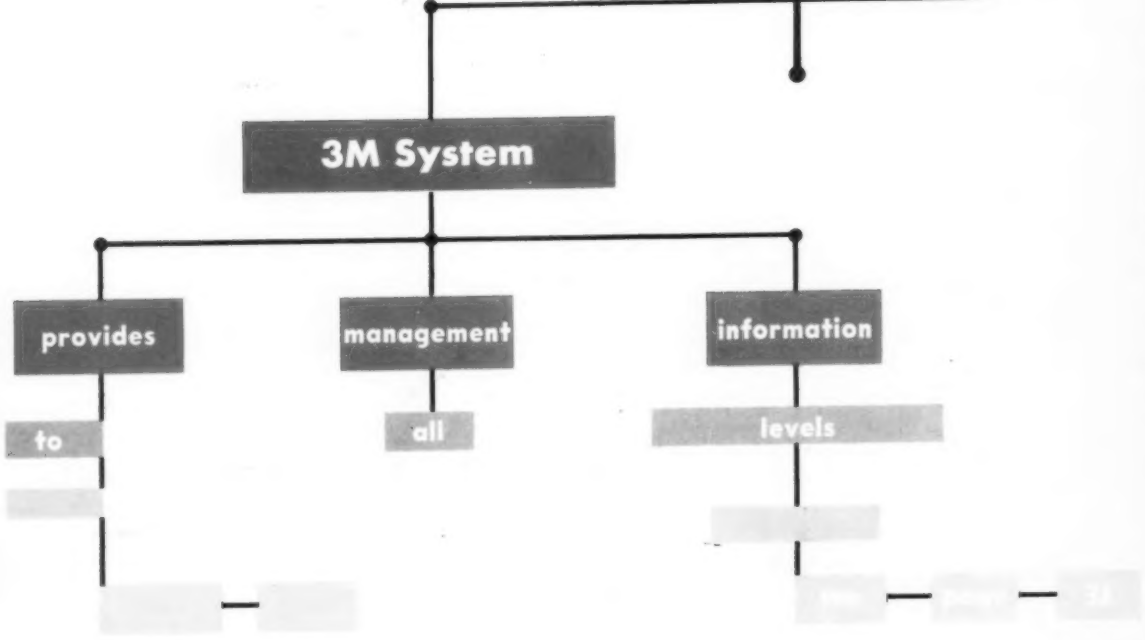


POCKET PAYOFF

1341 T—F-8E struck ramp.
1341 T—Pilot ejected from aircraft on flight deck.
1342 T—Landed in water alongside carrier.
1345 T—Hoisted by sling to rescue helo.
1347 T—Rescue helo landed aboard flight deck.

Ejection, seat separation, parachute deployment and helo pick up were smooth. This is the first operational ejection in which a parachute with "parachute canopy deflation pockets" (Clothing and Survival Equipment Change #5) has been utilized. The parachute collapsed completely in less than 10 seconds after touchdown in water.

INFORMATION is the life blood of EFFECTIVE maintenance.